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QUARTERLY JOURNAL

OF

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EDITED BY

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PART I.

ORIGINAL ESSAYS.

ART. I.—*Acute Inversion of the Uterus, and Death by Hæmorrhage.* By Surgeon-Major J. L. RANKING, Acting Garrison Surgeon, Trichinopoly.

CASES of complete inversion of the uterus after delivery are sufficiently rare to justify the record of every instance occurring in practice.

Dr. Ashwell, in his work on Diseases Peculiar to Women, (Edition of 1845) writes, "In many years private and consultation practice, I have only met with it twice, and in more than eight thousand labours occurring at the lying-in institute of St. George's Hospital, we have not had a single instance;" while Dr. Denman, in the *Dublin Quarterly Journal of Medical Science* for August of the present year, informs us that "out of *one hundred thousand** deliveries that took place at the Dublin Lying-in Hospital since its foundation, we have only a single instance of acute inversion of the uterus recorded." The infrequency of such cases is equalled only by the fatality which attends them, death in

* The italics are mine.

a large number of cases resulting from shock or hæmorrhage or both combined.

The accident is usually attributed to injudicious traction upon the cord in attempts to remove an adherent orretained placenta; but Dr. Tyler Smith has combated this view, and has advanced that it depends in all cases upon an active condition of the uterus itself, and is not generally to be laid to the charge of malpraxis as is usually held.

In the case I have to record, the accident is distinctly referred by the husband (a pensioned Medical subordinate) to injudicious attempts on the part of a native midwife to remove the placenta.

Case.

Mrs. ——— was delivered, at 2 P.M. of the 13th November 1865, of a living male child. The presentation was natural, and the labour an easy one. Almost immediately after delivery the native midwife is alleged to have been observed to be using more force than was justifiable in attempts to remove the placenta, "pulling violently at the cord, and directing the patient to strain and bear down forcibly." She was directed to desist, but almost before the order was given, the uterus was expelled, and alarming hæmorrhage set in. I was summoned, and within five minutes from the occurrence of the accident, was in attendance. I found the patient in articulo mortis, rapidly noticed that there was a perfect pool of blood beneath the bed, that the mattrass was saturated, and the patient lying in a pool of blood.

The uterus was lying between the thighs of the patient completely inverted, flaccid, and with the placenta adherent. Hæmorrhage had ceased. No immediate attempts at reduction appeared to me justifiable; attempts were made to rally the patient from impending death by syncope, by the administration of brandy. As Dr. Harper resided within a stone's throw almost of the house, I went over to him (leaving the patient in the care of her husband with directions to give brandy ad libitum) to ask him to return with me and decide in consultation, whether in the event of her rallying, the uterus should be reduced with the placenta attached, or whether it (the placenta) should be detached previous to reduction. I was only absent a very few minutes, but on my return with Dr. Harper, found the patient dead. She had expired, her husband said, as I

left the house and without the occurrence of any fresh hæmorrhage.

I have already remarked that the placenta was adherent, and I now determined that it required some force to detach it.

The points of interest for note in this case are, the immediate cause of death, and the cause of the accident.

Death clearly resulted from hæmorrhage. The pool of blood beneath and on the bed sufficiently established these facts, and satisfied me that the perilous condition in which I found the patient could not be attributed to "shock."

Had it not been for the evidences of alarming hæmorrhage, I should have at once proceeded to reduce the inverted organ—a proceeding which I considered under the circumstances, although undoubtedly the proper line of practice where the element of *shock* constitutes the principal danger to life, unjustifiable ; inasmuch as that the least additional hæmorrhage induced by the manipulative proceedings necessary to reduction, would have led to instant dissolution.

The sequel proved that the hæmorrhage which had already occurred precluded recovery.

In regard to the cause of the accident, the husband of the patient unhesitatingly attributed it to the injudicious attempt made by the midwife to remove the placenta ; measures which he was in the act almost of interdicting when the mischief was done. There may possibly have been that '*active*' condition of the uterus, which Dr. Tyler Smith considers sufficient to induce *per se* acute inversion after delivery, and that condition may have aided and abetted the midwife ; but I think we have in this case evidence that the accident resulted from "traction upon the cord;" and constitutes another instance of a valuable life being sacrificed to meddlesome midwifery.

ART. II.—*Acute Inversion of the Uterus.* By Surgeon W. N. CHIPPERFIELD, Acting Physician, General Hospital, Madras.

As I fully concur in the opinion given by Mr. Ranking, in the first paragraph of the foregoing paper, that the rarity of cases of complete inversion of the uterus after delivery justifies the record of every instance occurring in practice, I am led to publish the following case which occurred eleven years ago. It is the only case of acute inversion which I have witnessed.

I was called up one night in January, 1856, to see a woman who was said to be dying after delivery.

She was a delicate, weakly woman, and she had been delivered of her sixth or seventh child, about an hour before I was sent for. I found a Medical subordinate and a midwife in attendance, who informed me that the labour had been a severe one, that there had been much hæmorrhage, and that the placenta was retained. I was shown a considerable quantity of blood in a vessel, and I found the bed-clothes saturated; but the hæmorrhage had ceased before my arrival. The patient had a very rapid thready pulse, and sighing respiration, and was in a state of jactitation. Brandy was immediately given, and in order to ascertain the state of things locally, I gently took hold of the cord as a guide, and, without making the least traction, I introduced two fingers into the *os uteri* which was soft and flaccid, and I found a rounded hard tumour projecting from the upper and back part of the organ. Whilst endeavouring to pass the finger around this tumour to make out accurately what it was, my fingers were suddenly forced out and the entire uterus followed, forming a complete inversion which protruded beyond the vulva. Obtaining a light I examined the organ; there was no hæmorrhage; its surface was nearly dry and of a pale pink hue, and adhering to its left antero-lateral portion was a thin, dry, shrivelled placenta—certainly the smallest and most contracted placenta I ever saw. The lower margin—in the natural position, upper in its present position—of this placenta was slightly separated. Beginning at this point I gently peeled off the shrivelled mass; no hæmorrhage followed, and I immediately commenced the re-placement of

the uterus. This was effected without the least difficulty, by first indenting the fundus, which was now soft and relaxed, and then gently kneading the margins of the indentation. At first it ascended very gradually, but the final completion of the reduction was independent of my efforts, it was a sudden quick movement,—evidently the result of contraction of the fibres of the cervix.

The poor woman remained in an exhausted, restless condition, tossing wildly about. Brandy was assiduously given, but she died of exhaustion in a few hours.

There can be no doubt, that at the time I first saw the patient, she was in a most precarious state from post partum hæmorrhage, to which probably may be added the existence of that *introversion* which I detected upon examination, and which spontaneously became a complete inversion.

The case was reported to the Surgeon (now retired from the service) under whom I was doing duty, and, although nothing was said to me personally, I subsequently learnt, that in conversation with a medical friend, he had mentioned the case and delivered his opinion that the accident had occurred solely through my making violent traction on the cord, as he did not believe in the spontaneous occurrence of inversion. Of course, I could take no notice of this as it was related to me in confidence, but I was able to convince my friend, by reference to standard works, that the spontaneous occurrence of inversion was well recognized. I was scarcely prepared to hear an opinion that undue traction on the cord must be *the only cause* of such an accident, as not only did I remember, the instances of its spontaneous occurrence which my obstetric tutor, Dr. Waller, used to relate in his lectures, but I had by me printed authorities (as above mentioned) thoroughly satisfactory on this point.

It may be useful to give here some short extracts, from such obstetric works as are at my command just now, exhibiting the opinions of different authors on the causes of acute inversion of the uterus.

Denman.—Introduction to the Practice of Midwifery, 2nd Edition, 1801, Vol. II, page 351.

"With respect to the causes of inversion, it has generally been attributed, solely, to the force used in pulling by the *funis,* in order to bring away a retained *placenta.* But there is reason to believe, that the *uterus* has been inverted,

when on account of a hæmorrhage, or some other urgent symptom, the hand had been introduced into the *uterus* while in a collapsed or wholly uncontracted state, and the *placenta* being withdrawn before it was perfectly loosened, the *fundus* of the *uterus* has unexpectedly followed, and a complete inversion been occasioned. I have also been assured, that in some cases there has been a spontaneous inversion; that the accident happened, at least, when no force, or none capable of producing the effect, had been used; and then it was imputed to the shortness of the *funis*, giving the disposition before the birth of the child; or to some untoward action of the *uterus*. But with this assurance, or explanation, I do not feel quite satisfied, because the degress of force must always be vaguely estimated; though if a disposition to an inversion be first given by the force used in pulling by the *funis*, it may be completed by the action of the *uterus*; or, if the least possible degree of inversion were given by the shortened *funis*, it might certainly be completed by a very slight additional force in pulling by the *funis*."

Boivin and Duges.—A Practical Treatise on the Diseases of the Uterus and its Appendages. Translated by Heming. 1834, page 116.

"Previous distension of the uterus ought not to be considered as a real predisposition to inversion, except inasmuch as the uterus, entirely or nearly empty, retains a certain degree of softness, flaccidity, and inactivity, such as sometimes obtains after labour, and is denominated *inertia*. It is under such circumstances as these that efforts on the part of the patient, as for the expulsion of the placenta, may by the pressure of the intestines upon the fundus uteri, lead to depression in the first instance,* and afterwards, to inversion. M. Dailliez had adduced many examples in proof of this fact. Inversion will easily ensue, if the umbilical cord be hastily drawn, before the placenta is detached; and violence has often completely inverted the flaccid uterus, which had previously presented no sign of depression.

"The same consequence may occur even under careful treatment. An irregular, partial contraction,—that, for instance, which occasions the *encystment* of the placenta, may

* "We have seen a case of depression occasioned by the sacro-vertebral angle of a deformed pelvis: this was discovered on a post mortem examination."

circumscribe a flaccid portion, and force it inward, instead of strangulating it outwards. Astruc announced this in theory, and it has been borne out by experience."

Burns.—The Principles of Midwifery, 9th Edition, 1837, page 556.

"Inversion, in a great majority of instances, depends upon the midwife endeavouring to extract the placenta, by pulling the cord. Sometimes the uterus is directly pulled down and the placenta still adheres: in other cases, it is separated. It may also happen, if the child be allowed to be rapidly expelled, for, if the cord be short, or entangled about the child, the fundus may receive a sudden jerk, and become inverted. From the same cause, or, sometimes, perhaps, from sudden pressure of part of the intestines, on the fundus uteri, occasioned by strong contraction of the abdominal muscles, a part of the fundus becomes depressed like a cup, and encroaches on the uterine cavity. This generally rectifies itself, if let alone; but, if the cord be pulled, or if there be any tendency in the uterine action, to go towards the fundus, as happens when that part is lacerated, and may in like manner occur in the present case, the depression is speedily converted into perfect inversion, which may thus take place, spontaneously, and without any fault of the attendant."

Ashwell.—A Practical Treatise on the Diseases Peculiar to Women; 3rd edition, 1848, page 583.

"Of the *causes* some are intelligble enough. Hard or sudden traction on the umbilical cord, during a relaxed condition of the uterus, and a violent pulling away of the placenta by the hand before it is entirely separated, require no explanation. Dr. Davis dwells almost exclusively on a short cord, or the coiling of it around the neck of the child, as the great causes; but he is probably in error, as we do not find that inversion has followed in these cases, and in both instances of the disease which I have seen, the funis was of the usual length. There must be other causes beyond these mechanical ones; for the accident occurs spontaneously and after labours where there has been neither severity of pains, nor delay.

* * *

"There is probably prior to the inversion, a great change in the uterus; either sudden and violent contraction, or

instantaneous and complete relaxation ; or the first may be immediately succeeded by the latter state.

"It may then be safely inferred, that a quick labour, or any circumstance disturbing the natural progress of parturition, and inducing irregular and sudden contractions—the forcible use of instruments, mental excitement and alarm, and hæmorrhage resulting from attempts to remove the placenta, may all of them be regarded as so many causes of inversion. Capuron says, that dilatation of the os uteri, and atony and flaccidity of the uterine parietes, are the predisposing causes. The exciting causes are weight of the fundus, violent expulsive efforts, tractions by the funis, and the dragging of a polypus.

* * *

"Pulling at the cord, or withdrawing the hand from the uterine cavity, with the placenta only partially separated, and a short funis, are by no means the sole causes of inversion. I do not mean to deny that the uterus may be thus inverted ; but when it is remembered how often the funis has been short and the labour quick ; how many cases are recorded, several of which I have myself seen, where the child was precipitated and the cord suddenly snapped ; how often hasty practitioners and ignorant midwives have detached it from the placenta, and yet without inversion—it may not be improperly assumed, that this fearful accident has been too generally attributed to mechanical violence. Perhaps a cause more explanatory may be found in the operation of some concealed and ill-understood influence on the uterus itself immediately after labour, by which its functions become so deranged that contraction and relaxation of different portions of its structure simultaneously occur."

Simpson, Sir J. Y.—Obstetric Memoirs and Contributions; 1855, page 817. From a Review of Dr. Radford's Obstetric Essays.

"Inversion of the uterus is an accident which is sometimes concealed by the practitioner, because it is an occurrence which is very generally, but very undeservedly, conceived both by the patient's friends, and by the medical man himself, to attach blame to his character. This feeling is apt to paralyze the energies of the surgeon, and to prevent him from immediately adopting those measures which are

necessary for the reduction of the inverted organ. It is this procrastination which is blameable, and not the accident itself, which is one, as Dr. Radford has shown, that may happen in the best hands, seeing that it sometimes depends not so much upon any practice which the surgeon may have adopted, as upon morbid actions taking place in the uterus over which he has no control.

"Most authors attribute inversion of the uterus to causes purely mechanical—such as pulling rudely and violently at the funis in order to remove the placenta. But that this is not always the origin of inversion, is evident from a number of circumstances. The accident has happened repeatedly when the cord was of the usual length, before any force has been applied to it. It has been found before the child was attempted to be separated by dividing the cord; and it has occurred when the cord has been so putrid as to break with the slightest effort. We might refer also to cases where it has happened when the process of parturition was left entirely to nature; and in support of the same view of the subject, Dr. Radford might have quoted the cases recorded by Boerner (Loder's Journal für Chirürgie, &c., vol. i., p. 519), and Klaatsch (Henke's Zeitschrift for 1826, vol. iii., p. 45), in which this inversion took place in instances where the child was expelled some hours after the death of the mother, and when there was no person present to interfere with the process. According to the prevalent idea above alluded to, of the mechanical origin of inversion of the uterus, it is believed that the uterus is in a state of relaxation and atony, so that it offers no resistance to any force applied through the medium of the funis. Dr. Radford, however, has shown, by the history of several cases which he has himself met with, and of others recorded by Cleghorn, Brown, Merriman, &c., that the fundus and body of the uterus, so far from being in a state of relaxation, are, generally, if not always, in a state of unnatural contraction, as evinced by the strong and violent uterine pains which are present, and by the firmness and hardness of the inverted viscus. At the same time, however, that the fundus and body of the uterus are in this state of unnatural excitement and action, the os uteri appears to be comparatively relaxed and dilatable, seeing that it offers no resistance to the protrusion of the tumour through it. In other words, it is evident, that the fundus

and os uteri are in directly opposite conditions: the former is in a state of violent contraction, the latter in a state of atonic relaxation, and this relative difference in these two parts of the organ is indispensably necessary, as Dr. Radford conceives, for the possibility of the occurrence of inversion. In other words, it arises, like the hour-glass contraction of the uterus, from an inequality in the time and degree of contraction of the different parts of the organ; and in Herbin's Thesis on Incarcerated Placenta, Dr. Radford will find a case of this kind, highly illustrative of his views of the pathology of inversion, inasmuch as in the case alluded to, the portion of the uterus which formed the chamber retaining the placenta was, notwithstanding the bulk of its contents, so firmly contracted, that it passed through the very relaxed os uteri, and projected into the vagina.

"At the same time, while we freely confess that we believe Dr. Radford has proved that his explanation applies to the majority of cases of inversion of the uterus, we can easily conceive other instances in which, the whole uterus remaining uncontracted, a mechanical cause, such as strong traction at the cord of an adherent placenta, may lead to the same frightful accident, in the way pointed out by Spence, Clarke, Gooch, Gardien, and most of our other systematic writers on midwifery."

Churchill.—The Theory and Practice of Midwifery, 3rd Edition, 1855, page 531.

"Various causes are enumerated by authors, some of which are real, and some only fanciful. Most of them, however, are such as would act merely mechanically. It has been observed to follow very quick labours, especially if the patient be delivered standing, or if she make too violent efforts. It may occur spontaneously* after the labour has been completed quite naturally, and in these cases it has been attributed by Dr. Radford to atony of the uterus, or to active contraction of one part, with an atonic condition of another. Dr. Tyler Smith regards inversion as depending upon an irregularly active condition of the uterus, by which the fundus is first depressed, then carried downwards by the annular contraction of the uterus, and, finally, *completely* everted. Nauche considers the inactive state of the uterus, and some effort made by the patient, or by an attend-

* Waller's Edn. of Denman, p. 244—Note.

ant pulling the cord, as the principal causes.* Capuron enumerates, as *predisposing* causes, the development of the womb, the dilatation of its orifice, and the atony and flaccidity of its walls. The *exciting* causes may be the weight of the fundus, violent expulsive efforts, tractions by the funis, and the dragging downwards of a polypus.† Henkel attributes the accident to violent after-pains; Meissner to a bodily predisposition, owing to a laxity of fibre. Siebold says, that atony of the uterus, with a large pelvis, and the too rapid abstraction of the contents of the uterus, may expose the patient to inversion.‡ Boivin and Duges [see above.]

* * * * *

"It is very credible, that violence in extracting the placenta may be followed by inversion; or as Denman observes [see above]. * * * Forcibly pulling the funis, for the purpose of detaching the placenta, may, perhaps, under certain circumstances, give rise to the accident, but it is not a frequent cause. Shortness of the funis, or the shortening of it by coiling round the neck of the fœtus, has also been alleged, but, I believe, without any foundation. * * Inversion may occur quite unconnected with parturition."

Murphy.—Lectures on Parturition, 1852, p. 423.

"*The causes of inversion of the uterus* are most usually traceable to violence, although sometimes the accident happens spontaneously. *Pulling at the funis* improperly is, perhaps, the most frequent cause. The placenta being retained, an attempt is made to separate it by pulling the cord: at first, perhaps, gently, by and bye with more force, and at length, 'a long pull and a strong pull,' brings down the placenta and the fundus uteri completely beyond the vulva. * *

"*Shortness of the funis* is assigned as a cause producing inversion, but I believe this very rarely happens. * *

"*Spontaneous inversion* of the uterus sometimes happens. Mr. J. Clarkson relates an instructive case of this kind."

West.—Lectures on the Diseases of Women. Part I, 1856, p. 229.

"*Inversion of the uterus*, the turning of the organ inside out, is an accident clearly impossible in the natural condi-

* Mal. Prop. aux Femmes, vol. i, p. 181.

† Mal. des Femmes, p. 495.

‡ Handbuch der Frauenzimmerkrankheiten, vol. iii., p. 365."

tion of the unimpregnated womb; it being obviously essential for its occurrence that the organ should have attained a certain size, and that its walls should be comparatively yielding. It is indeed only at an advanced period of pregnancy that these conditions are generally met with, and only during labour that an exciting cause is likely to be superadded, capable of producing the misplacement; but at the same time, violent traction at the funis by some unskilled practitioner, before the detachment of the placenta, may mechanically invert the womb, or the organ may by its own contractions invert itself, just as the intestine does in cases of intussusception."

If my memory serves me correctly, Dr. West, in a subsequent edition of his lectures, has expressed himself more fully and strongly as to the uterus spontaneously inverting itself by its own contractions. The edition from which I have quoted is the only one I have by me now.

In the *Medical Times and Gazette* for October 27, 1860, there is an extract from the *Monatsschrift für Gebürtskunde*, in which several cases of Inversion of the Uterus are related. Dr. Brandt relates two cases to the Berlin Obstetrical Society. He states that although it was the interest of the midwives to hasten the termination of the labour, he had no proof that they had acted improperly. Professor Martin also referred to two cases, in one of which the inversion seemed to have been produced by traction on the cord made by the midwife. In the other case, the cause was doubtful. Dr. Mayer referred to two cases in which he was certain the occurrence was not produced by any external means, as he was present at the labours; and the expulsion of the placenta was left to nature. He referred likewise to a third case which had been also spontaneously produced.

Dr. Ebert stated that while engaged a few years ago in the compilation of a large work on inversion of the uterus, he could not find a single case recorded in which its production in consequence of a tumour could be regarded as indubitable. He believed, however, that it was possible an incomplete inversion occurring after delivery, might easily be overlooked, and become with the progress of time developed into a complete one. Professor Virchow had great doubts as to the possibility of the spontaneous production of inversion. In doubtful cases, he is, therefore, inclined to the opinion that the incomplete inversion produced after delivery, has

increased at a later period until complete inversion has been the result.

It will be noticed that both Dr. Ebert and Professor Virchow were referring to cases of so-called *chronic* inversion of the womb.

Dr. Kristeller referred to the case related by Baudelocque, in which inversion occurred in a girl eighteen years of age, whose hymen was unruptured, as a proof that the accident may arise independent of parturition.

I am not here making the slightest attempt at collecting recorded cases in proof of the proposition, that injudicious interference or violence on the part of the attendant is by no means the only, or even the most frequent, cause of acute inversion of the uterus, but I have just referred to the New Sydenham Society's Year Books of Medicine and Surgery, and I find at page 371 of that for 1859, and at page 370 of that for 1862, some details of cases of recent inversion, showing very clearly that the accident was of a spontaneous nature.

As regards the case I have related, I am perfectly satisfied that the degree of force was not vaguely estimated, as Denman says it may be, simply because there was not the slightest force used ; no traction whatever was made on the cord. I am further satisfied that, at the time I examined, there existed a depression, or introversion, or partial inversion of the fundus.

It is just possible, that the presence of my fingers may have excited that contraction which led to the ultimate complete inversion ; but my own opinion is that such was not the case, but that the accident was solely of spontaneous origin.

In regard to the treatment, authors differ as to whether it is better to separate or to leave the placenta before replacing the organ, but I believe the general opinion is, that if there is no hæmorrhage, and the placenta is partially detached, the separation should be completed before the uterus is reposited.

ART. III.—*Descriptions and figures of Five New Snakes from the Madras Presidency.* By Captain R. H. BEDDOME.

[*In continuation of Art. IV, Vol. IX, Page* 207.]

Plectrurus? trilineatus.—Snout rounded, not conical; cleft of mouth deep; eye large, pupil round; rostral slightly produced back, nasal forming a suture behind the rostral; supra-orbital shield present and a post-ocular shield distinct from the eye; one large temporal shield; no median groove along the chin; scales in 15 rows; posterior portion of the tail much compressed, some of the last scales very inconspicuously 2-3 keeled, terminal scale broad and ending in a small point, minutely tubercled above and with a deep grove below; body and belly of a bright brick-red color, with one dorsal and two lateral black punctated lines which extend from the neck to the end of the tail, the black dots each covering a scale; the lines are sometimes here and there interrupted by 1 to 3 consecutive scales being red, ventrals 165, anal bifid, subcaudals 15 pairs; total length 15 inches, circumference ¾ of an inch; the teeth are very conspicuous and gradually longer behind, there are about 8 in the upper jaw and 5 in the lower.

Anamallay forests; elevation 4,000 feet (Pl. I, Fig. 1. The 3 figures of the head considerably magnified). I have given a very full description, as this species differs in some points from the typical Plectrurus, and will perhaps have to be placed in a new genus.

Plectrurus sanguineus.—Tail compressed with the scales very obscurely keeled, terminal scale ending in a single sharp point; head elongated; rostral very small, nasals joined behind the rostral; frontals very large; vertical, 6-sided, diamond shaped; a supra-orbital and a post-ocular; one elongated temporal between 4th labial and occipitals; eye rather large, pupil elliptic, erect; no median groove along the chin; scales in 17 rows, abdominals 144, subcaudals 7 pair; color of back and sides dull black, belly red, here and there interrupted by black markings.

Anamallay forests; 4,000 feet elevation (Pl. I, Fig. 2. Coloured portion of the body life-size; figures of the head and tail magnified). The eye is much larger than in Plectrurus Perottetii, and instead of being in front of the ocular, it is as it were distinct; the supra-orbital is very large, and there is a large temporal shield, it seems nearly allied to the last species, but the tail is quite that of "Melanophidium."

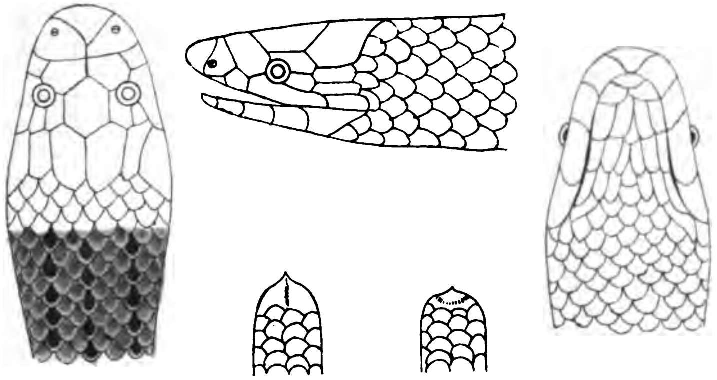

Fig: 1
PLECTRURUS TRILINEATUS
(BEDD.)

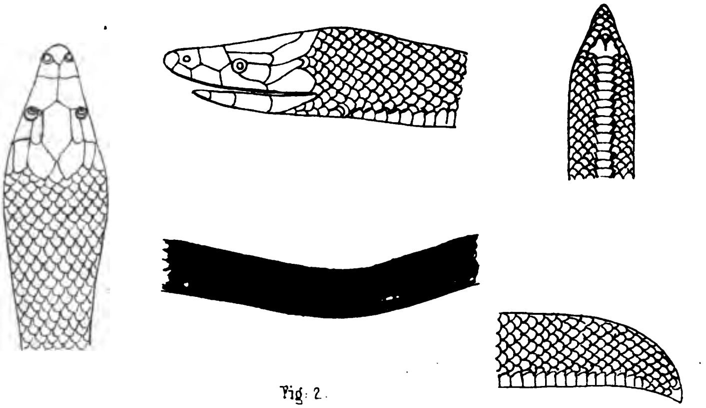

Fig: 2.
PLECTRURUS SANGUINEUS
(BEDD.)

Alexr Barren. Lithog. Madras. 1867.

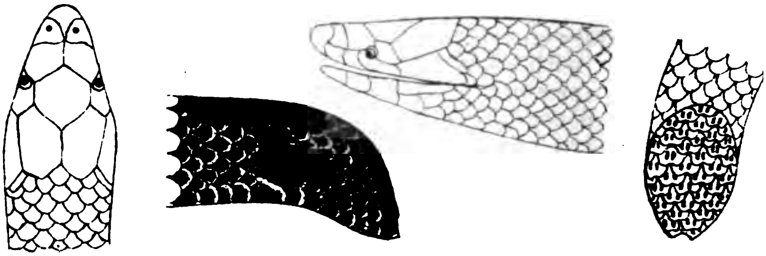

Fig: 3.

SILYBURA RUBRO MACULATA

(BEDD.)

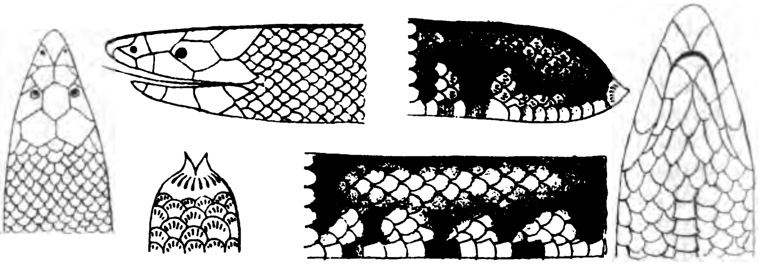

Fig: 4.

RHINOPHIS GRANDIS.

(BEDD.)

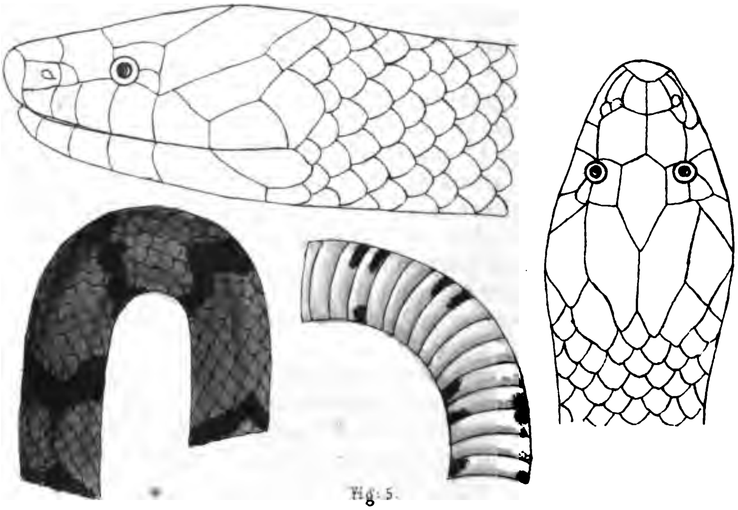

Fig: 5.

CALLOPHIS CERASINUS

(BEDD.)

Silybura rubro-maculata.—Caudal disk well defined as if cut off with a knife, scales of the disk very prominently 2-keeled, terminal scale large, square at the end or very inconspicuously bi-cuspid ; abdominals 127, some of the last nearest the tail double, sub-caudals 8 pair, scales in 17 rows ; color brownish, a portion of each scale dull yellow, the yellow color predominating on the belly and sides, 5 red blotches along the sides on the anterior portion of the trunk, one on each side of the tail near the vent.

Anamallay forests; 4,000 feet elevation (Pl. I, Fig. 3.) Nearly allied to S. Elliotii, but with quite a different coloration.

Rhinophis grandis.—Snout obtusely pointed; rostral shield rather acute behind, produced back far between the nasals but not touching the frontals, from one-third to one-fourth the length of the head without any distinct keel ; caudal shield small, bi-cuspid, the points side by side ; trunk surrounded by 17 rows of scales, the anterior portion by 19 rows ; ventrals twice as large as the adjoining series, scales of the tail and a few of the last scales of the trunk near the vent furnished with 2-3 keels ; color of the back brownish black, belly yellowish, the yellow color rising in triangular markings which are alternate with similar markings of the color of the back, the dark coloring sometimes joining those of the other side, particularly in the anterior portion of the belly, and so forming transverse bands across the belly ; length up to 2 feet with a circumference of a man's thumb.

Anamallay forests in moist woods at 4,000 feet elevation, (Pl. I, Fig. 4.)

This is the largest earth snake (uropeltid) in our presidency. It is nearly allied to my Plecturus Pulneyensis (figured in plate 1, number xviii. of this Journal) which Dr. Günther the great Ophiologist has removed to Rhinophis, and this snake must belong to the same genus;—the head in both is that of Rhinophis, but the tail is very different to that of Rhinophis sanguineus.

I may here mention that Dr. Günther has made a new genus for my Plectrurus Wynadensis (Melanophidium.)

Callophis cerasinus.—Rostral slightly produced back between the anterior frontals; anterior frontals only half the size of the posterior, the latter touch the orbit ; no loreal and *no anti-ocular;* nostril between 2 nasals ; 7 upper labials, 3rd, 4th, and 5th very high, 3rd and 4th enter the orbit ; 1 small

post-ocular; vertical 6-sided, elongated, pointed behind; superciliars small; occipitals large, elongated, pointed behind, with a pair of large temporals on each side; anal entire. Back purplish-brown with a shining nacreous lustre, with transverse broad irregular-shaped black bands extending to the tip of the tail (about 40) at nearly equal distances and which are continued (though not broad)underneath the belly and tail but do not quite meet; sides (2 or 2½ of the lowest row of scales) and belly of a bright cherry color, head black in front, neck with the 5th, 6th and 7th labials and a portion of the occipitals cherry-colored. Length 21½ inches, of which the tail is 2 inches; cirumference 1⅛ of an inch; sub-caudals 31, abdominals 228.

Malabar forests—Wynaad, elevation 3,000 feet (Pl. II. Fig. 5. The 2 figures of the head magnified; portions of the body life-size).

NOTE.—The following alterations should be made in the Nomenclature of my former Catalogues.

Callophis concinnus (Bedd.) (Vol. vi., page 45, Plate i., Fig. 2.) = Callophis Malabaricus (Jerd.) This species was also described by Dr. Günther, as C. nigrescens, but Jerdon's is a much older name; it varies very much in its coloration. I have procured it on the Nilgiris and Shevaroys and in the Wynaad.

Rhabdosoma microcephalum (Vol. v. page 10,) (Geophis microcephalus of Dr. Günther's Reptiles of British India) is the Platypteryx Perroteti (Dum. et Bibr.)

Ablabes collaris (Vol. v., page 13) of my former catalogues differs from the true collaris and is A. Humberti (Günther); it is abundant in the Wynaad and in South Canara.

Spilotes vittatus (Vol. vi., page 43) is a Tropidonotus = T. Beddomii (Günther.)

Psammophis Indicus (Bedd.) (Vol. vi, page 45) = P. Condanarus (Blyth.)

Trimesurus strigatus (Gray) and T. Neilgherriensis (Jerd.) are one species = T. strigatus (Gray). (Vol. v., page 2.)

Trimesurus Malabaricus (Jerd.) = T. Anamallensis (Günther), but Jerdon's is the older name. (Vol. v., page 2.)

Trimesurus macrolepis (Bedd.) (Vol. v., page 2, plate 2, fig. 6) is placed in a new genus by Dr. Günther = Peltopelor macrolepis.

Tropidophis schitosus (Gray) (Vol. v., page 9) = Atretium schitosum. (Cope.)

Chersydrus annulatus (Gray) (Vol. v., page 7) = C. granulatus (Schneid.)

Cerberus cinereus (Gray) (Vol v., page 7) = C. rhynchops (Schneid.)

Hypsirhina Aer. (Wagl.) (Vol. v., page 9) = H. enhydris (Schneid.)

Calamaria Linnæi. (Vol. v., page 10) = Ablabes Humberti (Günther.)

Xenodon viridis (Dum. et Bib.) (Vol. v., page 14) = Tropidonotus plumbicolor. (Carst.)

Coryphodon Blumenbachii (Dum. et Bib.) (Vol. v., page 17) = Ptyas mucosus. (Cope.)

Dryiophis prasina (Vol. v., page 19) = Tragops dispar. (Günther.)

Dryiophis tropidococcyx (Günth.) (Vol. v., page 19) = Tropidococcyx Perroteti (Günth.)

Passerita mycterizans var. fuscus (Vol. v., page 19) = P. purpurescens (Günth.)

Eudipsas cynodon (Vol. v., page 20) = Dipsas Boops (Günth.)

Typhlops Russellii (Vol. v., page 27) = Onychocephalus acutus (Dum. et Bib.)

Argyrophis Bramicus (Vol. v., page 28) = Typhlops Braminus.

ART. IV.—*Special Report of an outbreak of Jail Diarrhœa, assuming a choleraic form, in the District Jail of Nellore, during the months of September and October* 1866. By E. E. LLOYD, Esq., Zillah Surgeon, Nellore.

(Communicated by the Principal Inspector General, Medical Dept.)

THE prisoners in the Jail having enjoyed an unusual amount of health during the previous four or five months,—after recovering from a very severe type of diarrhœa on the introduction of raggee into their diet in the place of rice, which was put a stop to then, and has not since been resumed,—were, early in September, seized with another attack, which seemed gradually to take them, but soon put on a very serious type in many, assuming a choleraic form, though not true cholera, proving fatal to some of those who died in less than twelve hours, but many of them, from fear of going to hospital, not reporting themselves sick to the maistries or warders, had been suffering from diarrhœa for many hours, and consequently, when admitted, were found to be in a very bad state.

2. A gang, varying in number from five to eighty men, had been at work since early in July in clearing out a tank, and afterwards carting away the dry black soil taken therefrom, and this I consider to have been the cause of the outbreak, for the first few cases that were admitted into hospital occurred among those who had been so engaged.

3. Those attacked were of all ages, from 17 to 51 years, and mostly prisoners who had been but a short time in confinement.

4. Of the thirty-seven cases admitted, thirty-three were males and four females, of which eight of the former proved fatal and three of the latter.

5. In all, the symptoms varied; some were seized with vomiting and purging, some with purging without any vomiting;—the motions also varied, in most of them they were watery, with flocculi like half-digested grains of rice as sediment; in colour, some clear, some like dirty muddy water, others variously coloured from pale-yellow to dark-red, the latter, caused by the passing of blood;—in nearly all was abdominal pain, more or less severe, and cramps.

The pulse remained distinct in nearly every case, though in many very weak and just perceptible, in all quick. The temperature of the body also varied, in some there was an unnatural heat, in others it was much below. In a few there was suppression of urine, in the rest the urine was free; —in not one case was there real collapse; those which terminated fatally did so before collapse set in from exhaustion, increased in most cases from excessive pain in the abdomen which nothing seemed to check. In one case death was preceded by coma for some hours; the result of effusion on the brain. The appearances of those examined *post mortem* were very similar. The lungs collapsed and shrunken, the heart and vessels loaded with blood, dark in colour, mostly coagulated and fibrinous; the intestines, both large and small, more or less congested or inflamed. In one there was a large mass of ulceration, the size of half a rupee, with a dark purplish inflamed margin near the pyloric end of the stomach, not perforating its coats, but very nearly doing so; and in another there were small patches of ulceration in the small intestines.

6. The treatment consisted in Tinct. Opii. ♏ xxx. on first admission, which in a few cases checked the diarrhœa, and then in different cases were tried different remedies, such as Lead and Opium, Calomel and Opium, Paterson's Pills, or the following draught after each action:—℞. Acid. Sulph. dil. ♏ xxx., Ætheris Chlorici ♏ xx., Tinct. Opii. ♏ xx., Aquæ Menthæ ℥iss., which latter I found generally of more service than any of the preceding. To allay vomiting and hiccough, effervescing draughts, with a few drops of Creasote, which generally had the desired effect—or when the powers seemed to be failing, I gave the following mixture with advantage:—Sp. Ammon. Arom. ʒss, Sp. Æther. Nitrici ʒss., Tinct. Cardamomi Co. ʒss., Mist. Camphoræ ℥iss., together with small and occasional doses of brandy, and water in moderate quantity was allowed them to drink. Sinapisms and dry rubbing were applied for the relief of the cramps, and hot fomentations, and turpentine stupes to the abdomen. On the cessation of the above symptoms, to enable them to regain their strength, I gave Quinæ Disulph. gr. ii., Tinct. Camphor. Co. ♏ xx., Acid. Sulph. dil. ♏ x. in a little water, which proved of much use. They were kept up from time to time with nutritious food in the shape of good broths, arrowroot, milk, &c.

7. The first admission occurred on 16th September, which ended in recovery in four days. Another came in on the 18th, and another on the 21st, which latter proved fatal from effusion on the brain (the case alluded to above) in six days. The next admission did not occur till the 26th, when they came in very rapidly five or six a day for two or three days, many of which proved fatal in less than twelve hours. Preparations were then made to encamp the prisoners; the huts requiring some little time to erect, they went out on the 10th October, since which there have been no admissions of a severe type, though there have been one or two of a mild nature.

8. The cells in the new jail have been freely fumigated, cleansed and white-washed, and new ventilations put in, the privies re-tarred and otherwise purified; the clothes and bedding have been chiefly burnt, and those but slightly soiled have been boiled and washed in water with a mixture of chloride of lime and wood ashes.

ART. V.—*Report on the Cases of Cholera treated at the Native Infirmary, Madras, from July to October* 1866. *By* Surgeon-Major W. J. VANSOMEREN, M.D., Surgeon 1st District.

(Communicated by the Principal Inspector General, Medical Dept.)

I HAVE the honor, in accordance with Circular Memorandum No. 3466, dated 22nd August 1866, to report briefly upon the recent epidemic of cholera in my district, so far as that epidemic has come under observation in the Native Infirmary.

2. The last daily report shewed you that since the 14th July there had been 123 cases and 71 deaths, thus giving 42·277 as the proportion of recoveries *per centum*, and 57·723 as the death rate.

3. Of the admissions, 17 came from the Idiot Asylum, 35 from the Monegar Choultry, 2 from the Foundling, and the remainder from the town of Madras. While of these several numbers there were 8 casualties among the inmates of the Idiot Asylum, 24 among those of the Choultry, and 39 among the town cases.

4. Of the 24 deaths among the Choultry inmates, 22 occurred in individuals above the age of 45, and of the latter number, half (*i. e.* 11) were above the age of 55.

5. The alarming increase in the number of cases from the Choultry in September, led me to connect aggravation of the disease there with some local cause, and enquiry forced me to the conclusion that that cause was overcrowding. I accordingly recommended the removal of about sixty persons into tents, which was effected on the 12th September. Since that date there have been four admissions with cholera, three from the Choultry and one from the tents.

6. The same cause contributed to the rapid spread of the malady in the Idiot Asylum, and transfer of some of its inmates to the Foundling Hospital served to check its prevalence in the former institution.

7. Regarding the symptoms of the cases, I may mention that none was returned as a case of cholera, which did not present the rice-congee-water evacuations, associated with suppression of urine. Cramps existed in only one or two cases during the whole epidemic; and in two cases I observed a papular eruption during reaction. The appearance of this eruption (strange to say) I failed to enter in the case of a patient called *Israel*, but it has been noted in that of *Pariah*.

8. The treatment of the disease has been the same throughout the whole course of the epidemic, which, like all such visitations, was much more fatal at its commencement than at its termination. That treatment of course varied according to present symptoms. Vomiting was met with soda draughts or chloroform internally, assisted by counter-irritation on the pit of the stomach externally. Copious serous purging was combated with large doses (ʒss.-ʒi.) of Dilute Sulphuric Acid, with Tr. of Lavand. (or Tr. of Catechu) ʒ i. and ℥ iv. of water, after each evacuation. Ammonia was used as a stimulant according to circumstances. And then, when reaction took place, to reduce injection of eyes and other head symptoms and to restore secretion of urine, if this continued suppressed, mild aperients were administered, followed by minute doses of Antimony when necessary, and the application of blisters to the vertex. And to remove persistent debility, mineral acids and bitter tonics were exhibited.

ART. VI.—*Report on the Cases of Epidemic Cholera treated in the Royapettah Dispensary, Madras, from 8th July to 1st November,* 1866. By Surgeon-Major P. G. FITZGERALD, M.D., Surgeon 4th District.

(Communicated by the Principal Inspector General, Medical Department.)

As no case of Cholera has been received into the Royapettah Hospital since the 1st instant, the Epidemic may now be considered to have ceased, and the statement of Practice referred to in Circular Memorandum No. 3466 of the 22nd of August last, from the office of the Principal Inspector General, to have become due.

2. The first case of the disease was admitted on the 8th of July and the last on the 1st of November. Between these dates there were 46 admissions altogether as in-patients. The out-patients, of whom there were 36 affected with cholera, are excluded from consideration in this Report, as the result of the very meagre and desultory treatment, to which alone they could be subjected, was unknown in the majority of them. Of the 46 cases treated in hospital, 25 recovered, 20 died, and 1 was removed soon after admission, the result of which was not ascertained.

3. The maximum time in hospital of the fatal cases (excluding one exceptional case of 5½ days duration) was 48 hours.

The minimum time	¾ hour.
The average time................................	12¾ hours.
Maximum time in hospital of recovered cases.	10 days.
Minimum ditto	2 ,,
Average ditto	5 ,, 15 hours.

4. Generally the patients were not brought to Hospital until the disease was far advanced, and a considerable number were brought only to die. Of the latter many were picked up by the police in the streets or in deserted sheds and verandahs, where their friends, if they had any, had left them;—these cases were hopeless and beyond the reach of help from their first admission.

5. In only 4 cases were cramps observed, and 4 others were distinguished by the discharge of one or more worms of the lumbricoid species from the stomach or bowels. These last all recovered.

6. The immediate exciting cause could very rarely be ascertained. In a few instances it was traceable to a drink of toddy, eating raw gram, or some other indigestible substance. The worms observed in the evacuations of the four cases before-mentioned were probably the exciting cause of the disease in them. Cases of this description are by no means uncommon among Natives and East Indians. I have observed them in every epidemic which it has been my fortune to witness in this country, and, as in the four cases just mentioned, recovery has been the rule among them. Perhaps in these cases the intestinal irritation induced the symptoms of the prevailing epidemic prematurely, as it were, and before the system was fully charged with the poison; thus provoking a milder attack than would have occurred had more time been allowed for its accumulation in quantity sufficient to develop the disease by its own innate force—for the same reason that inoculated small-pox was less fatal than that which occurred spontaneously, viz., because the disease was brought on at a time when the organism was in the most favourable condition for overcoming it.

7. The last case admitted was that of a Toty attached to the Hospital,—with this exception the servants and staff of the hospital, including a large body of students, as well as the patients admitted for other diseases, enjoyed complete immunity from the disease. I am disposed to attribute this fortunate circumstance, in a great measure, to the fact that the cholera patients at any one time were, of necessity, few in number, and were lodged in an open verandah in which no stagnation of foul air could occur, but which was nevertheless well sheltered from the inclemency of the weather by the surrounding buildings. The small rooms opening on this verandah were originally destined for the reception of cases of this and other diseases requiring segregation, but it was not considered advisable to occupy them until the alterations which had been ordered at my suggestion, for improving the ventilation, were carried out.

8. *Treatment.*—The condition in which a large proportion were when brought to hospital, rendered it necessary to have recourse to stimulants in the first instance. Afterwards, or if no stimulants were required immediately, calomel and carbonate of soda in doses of two grains each, were given every hour or two until six or eight doses were taken. If

the stomach was very irritable five grains of calomel were given as a first dose. Afterwards the calomel was generally re-placed by grey powder. In young children and infants grey powder was generally given instead of calomel. Concurrently with this, the patient was given, at longer or shorter intervals, according to circumstances, a dose of a mixture composed of a solution of sesquicarbonate of soda with spirit of nitrous ether, aromatic spirit of ammonia, and spirit of lavender. The drink was conjee-water ad libitum.

9. The object sought to be obtained was not so much the cessation of the evacuations as an alteration in their character—to hasten or induce those changes in the secretion of the liver and kidneys as well as of the intestinal glands which are observed always to accompany a real amendment in the course of the disease, and without which any other appearances, however promising, must be considered as uncertain if not illusory signs of improvement. Indeed after the disease was once thoroughly established, the sudden cessation of vomiting and purging, before the secretion of urine was re-established and the evacuations became somewhat coloured, was always a sign of ill-omen; and even after those changes had taken place, it was by no means desired. In one case of the latter description a purgative enema was given with the most satisfactory result and the patient recovered.

10. For this reason opiates and astringents were considered inapplicable in the stage at which the disease had arrived when the patients were usually brought in, and Paterson's pills, though an excellent remedy for the premonitory diarrhœa, were only prescribed in one instance.

Turpentine, either alone or with castor oil, was given in all the cases in which worms appeared in the evacuations. In a case of threatening coma from uræmic poisoning, blisters to the head and loins removed the dangerous symptoms and placed the patient in safety.

11. The excreta were received into pans containing some of McDougall's disinfecting powder, and were afterwards buried. The foul clothing was boiled with water in chatties before being issued to the Dhoby.

12. During the last few weeks of the epidemic the small rooms of the verandah before mentioned, were available for the patients, who were accordingly moved into them during

the night, but always brought out again in the day-time. In this way the rooms were always kept fresh and clean, and I think the sick were the better for it. The recoveries, notwithstanding the late period at which the majority of the cases were brought under treatment, were 55 per cent.; but, were those cases which were beyond the reach of all remedy when first seen eliminated from the calculation, I do not hesitate to say that the proportion of recoveries would have been nearly 70 per cent.

ART. VII.—*Report on the Treatment adopted in the recent Epidemic of Cholera at Pollachy.* By Native Surgeon V. RUTHNUM MOODELLY.

(Communicated by the Principal Inspector General, Medical Department.)

1. WITH reference to para. 8 of Circular Memorandum No. 3466, dated 22nd August 1866, from the office of the Principal Inspector General, Medical Department, I beg to submit the following account of the treatment adopted during the recent epidemic of Cholera which prevailed in the Town and Talook of Pollachy.

2. As soon as the premonitory diarrhœa or first stage of Cholera set in, Dr. Paterson's pills composed of calomel, acetate of lead, opium, camphor, and powdered chillies in place of the aromatic powder, were administered in doses of ½ to 1 or 2 pills according to the age of the patient, in a little water or thin congee, after each motion, up to an average of 6 or 8 pills in number. Sinapisms, frictions, and external warmth were also used according to circumstances, and thin congee for nourishment.

In the stage of collapse, Condy's Disinfecting Fluid was tried in some cases but without success, probably from not being employed earlier. It had however, the effect of raising the pulse and temperature for a time before sinking ensued.

In some cases the acetate had the effect of suddenly stopping the evacuations, causing distension of the abdomen. One or two doses of calomel usually relieved the distress thus occasioned.

When vomiting was urgent and unaffected by sinapisms, a ten-grain dose of calomel with one of opium, had the desired effect.

3. Almost all the successful cases (the deaths being 7 out of 24, or 29 per cent.) were treated at their own houses, where they were free from the injurious influence of crowding several patients together, besides having the attention of their relatives.

4. I have also received accounts from the surrounding villages where cholera medicines were largely distributed, that where the acetate was used it was attended with favorable results.

5. The disease not being of a severe type, many cases in and out of the station were reported to have done well without any treatment or with simple native remedies. A great number of them may have been diarrhœa or choleraic diarrhœa dependent upon causes which determined famine elsewhere.

6. Simple sanitary rules were drawn out and circulated amongst the villages and enforced in the station from time to time.

ART. VIII.—*Report on the Cases of Epidemic Cholera treated in the General Hospital, Madras, from July 4th to October 31st,* 1866. By Surgeon W. N. CHIPPERFIELD, Acting Physician, General Hospital.

A REFERENCE to the Madras Mortuary Reports for the last ten years shows that cholera is never completely absent from Madras, and that about once in three years, sometimes oftener, it prevails with epidemic influence. The second quarter of the year is *generally* (not always,) that in which the fewest cases occur, and the third quarter is *generally* that in which the disease is most prevalent and most fatal. This year the deaths from cholera were considerably below the average of the last five years, until the middle of the fourth week of March, when they exceeded the average ; they then

rapidly declined and by the second week of April were again below the average, and continued so until the second week of June, when they rapidly increased. The disease broke out epidemically about the beginning of July. I have fixed the 4th of July as the date of the commencement of the epidemy so far as it came under my cognizance.

The records of the General Hospital will not afford any correct conclusions as to the comparative prevalence and fatality of cholera in Madras in the different months of the year, because when the disease is not epidemic, but few cases are brought to hospital, and those that are brought are almost always in a hopeless state.

I here submit:—

Table I, showing the Admissions and Deaths from Cholera in the General Hospital, during the first six months of 1866.

Month.	Europeans.		Eurasians.		Natives.		Total.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
January........	2	1	...	...	7	3	9	4
February......	1	1	2	1	2	0	5	2
March..........	...	...	1	1	2	1	3	2
April.............	...	...	...	...	...	...	...	...
May.............	...	...	...	...	1	1	1	1
June.............	2	2	...	...	3	2	5	4
Total...	5	4	3	2	15	7	23	13

giving a per-centage of 43·478 recoveries, and of 56·522 deaths.

I have prepared the following table in order to show at a glance, the date of admission, sex, age, duration of illness, result, condition on admission, and outline of treatment of every case admitted into the General Hospital during the continuance of the late epidemic.

Table II, exhibiting particulars of 114 *cases of Asiatic Cholera treated in the General Hospital, Madras, from July 4th to October* 31*st*, 1866, *during which time the disease prevailed under Epidemic Influence.*

EUROPEANS.

Date.	Sex. M.	Sex. F.	Age. Yrs.	Duration of Disease from commencement to termination.	Time in Hospital.	Results. Recovered.	Results. Died.	Condition on admission; concomitant symptoms.	Treatment.
July 4	...	1	16	Unknown	11 hours	...	1	A paralytic; deep collapse, cramps.	Oft repeated small doses of calomel. Stimulants.
„ 13	1	...	32	14 hours	6 „	...	1	Collapse, cramps, urgent dyspnœa.	do Bleeding.
„ 17	1	...	50	16 „	11 „	...	1	Collapse, dyspnœa, severe cramps.	do
„ 26	1	...	46	3½ days	22 „	...	1	do do do	do Free stimulation.
Aug. 2	1	...	33	7½ „	6½ days	...	1	Collapse, cramps, coma; no urine voided.	Nitric Acid and Chloroform, Emetics, Rhubarb and Chlorate of Potash.
„ 5	1	...	60	5½ „	5 „	1	...	Not collapsed; cramps.	Nitric Acid, Rhubarb.
„ 8	1	...	49	10 „	9¼ „	1	...	do violent reaction.	Chlorodyne, Salt Emetic, Calomel and Saline mixture.
„ 13	1	...	59	8 „	7½ „	1	...	Collapse, violent cramps, hiccup.	Calomel and Saline.

Table II. continued.

EUROPEANS.—(continued.)

Date.	Sex. M.	Sex. F.	Age. Yrs.	Duration of Disease from commencement to termination.	Time in Hospital.	Results. Recovered.	Results. Died.	Condition on admission; concomitant symptoms.	Treatment.
Aug. 15	1	...	27	7 days.	6 days	1	...	Partial collapse, great restlessness.	Calomel and Saline.
„ 29	1	...	49	6 „	5¾ „	1	...	Collapse, no cramps.	do
„ 30	1	...	50	12 „	11½ „	1	..	Collapse, Mercurial Purging persisted, Ptyalism.	Calomel and Astringents.
Sept. 16	1	...	55	23 hours	11 hours	...	1	Collapse ; violent cramps.	Essence of Omum ; Saline.
Oct. 2	1	...	42	6 days	5½ days	1	...	Partial collapse ; cramps.	Saline Emetic and mixture.
„ 18	1	...	23	3½ „	3 „	1	...	Prostration ; no cramps.	Spts. Chloroformi, Quinine, Rhubarb and Chlorate of Potash.
„ 20	1	...	30	7 „	6 „	1	...	Partial collapse, cramps ; obstinate vomiting.	Spts. Chloroformi and Sulphuric Acid, Enemata.
„ 25	...	1	45	9 „	8 „	1	...	A paralytic ; no collapse, severe cramps.	Spts. Chloroformi and food.
Total...	14	2				10	6		

EURASIANS.

July	6	1	...	25	20 days	20 days	1	...	Not collapsed, no cramps, Roseola	Calomel and stimulants.
„	7	1	...	25	19 „	19 „	1	...	Collapse, cramps, Roseola.	do
„	9	1	...	20	17 „	17 „	1	...	Collapse, cramps, Uræmia, obstinate vomiting.	do Bleeding.
„	17	...	1	20	Unknown	19 hours	...	1	Collapse, cramps.	do
„	20	1	...	33	„	4 „	...	1	Collapse, severe cramps.	do
„	20	...	1	1¾	2½ days	2 days	1	...	Not collapsed.	Calomel ⅓ gr. every hour.
„	20	1	...	8	3¼ „	3 „	1	...	Partial collapse.	do every ½ hour.
Aug.	6	1	...	5	13¾ hours	12¾ hours	...	1	Severe cramps, obstinate vomiting, collapse set in; dyspnœa.	Chlorodyne, effervescing salines. Food.
„	8	...	1	7	5 days	5 days	1	...	Collapse; soon rallied, passed many ascarides lumbricoides.	Calomel and Saline, Tonics.
„	14	1	...	13	12½ „	12 „	...	1	Imperfect collapse, rallied, but died comatose.	Salt emetic, Calomel, Castor oil, food.
„	14	1	...	3	10 hours	8¾ hours	..	1	Collapsed, never rallied.	Stimulants and Calomel.
„	17	1	...	19	7 days	6 days	1	...	Partial collapse.	Calomel and Saline.
„	18	...	1	40	6¾ „	6 „	1	...	Collapse, cramps, Ptyalism.	Salt emetic, Calomel, dry cupping to loins; Pot. chloras and Chloroform.
„	20	1	...	2	12 hours	2 hours	...	1	Deep collapse, never rallied.	Saline emetic.
„	25	...	1	25	10¾ days	10 days	1	...	Collapse, cramps; recently delivered; distress from secretion of milk.	Salt emetic, Calomel & Salines.
„	26	...	1	21	13 „	12. „	1	...	Was delivered at full period of a still born child an hour after admission.	Hot Brandy and water. Food.
„	26	1	...	30	9½ „	9 „	1	...	Not collapsed, cramps.	Astringents.

Table II. continued.

EURASIANS.—(continued.)

Date.	Sex. M.	Sex. F.	Age. Yrs.	Duration of Disease from commencement to termination.	Time in Hospital.	Results. Recovered.	Results. Died.	Condition on admission; concomitant symptoms.	Treatment.
Aug. 26	1	..	11	5 days.	5 days.	1	...	Not collapsed, no cramps.	Saline
„ 27	...	1	10	8 hours	3¾ hours	...	1	Collapse, never rallied, spasm of diaphragm.	Saline emetic, stimulants.
Sept. 4	1	...	19	5 days	5 days	...	1	Cramps, rallied and was walking about; but had a relapse on the 4th day and died in 16 hours.	Salines, Stimulants.
„ 10	1	...	12	12 hours	8 hours	...	1	Collapsed, no vomiting at first.	Castor oil.
„ 20	1	...	2	9 days	8 days	1	...	Collapsed, passed worms.	Food only, one dose of stimulant.
„ 24	1	...	5	3 „	3 „	1	...	Almost collapsed.	do do
„ 26	...	1	28	6½ „	6 „	1	...	Almost collapsed; at full period of pregnancy, and labor pains set in on 6th day, when recovered.	do and Spts. Chloroformi, Hot Brandy and water.
„ 27	...	1	50	27 „	27 „	1	...	Collapse, cramps.	Saline, Hot Brandy and water.
Oct. 2	...	1	3	10½ hours	5½ hours	...	1	Deeply collapsed, no rallying.	Omum Essence, Salt emetic.
„ 23	...	1	10	5½ „	2 „	...	1	do Coma.	Spts. Chloroformi and Opium, Saline.
Total...	16	11				16	11		

Table 11. continued.

NATIVES.

July 4	1	...	24	4 days	4 days	1	...	Collapsed.	Small doses of Calomel. Stimulants.
„ 9	1	...	14	12 „	12 „	1	...	do	do
„ 10	1	...	35	Unknown	4 hours	...	1	Deeply collapsed ; cramps.	do
„ 10	...	1	29	do	23 „	...	1	do do	do
„ 12	...	1	26	8 days	8 days	1	...	Collapsed ; cramps.	do
„ 12	1	...	28	7 „	7 „	1	...	Partial collapse.	do
„ 13	...	1	27	Unknown	4 hours	...	1	Collapsed ; cramps.	do
„ 14	1	...	42	5 days	5 days	1	...	Partial collapse.	do
„ 18	...	1	40	Unknown	5 hours	...	1	Deeply collapsed ; cramps.	do
„ 20	1	...	25	do	23 „	...	1	do	do
„ 21	1	...	25	25½ hours	7 „	...	1	Collapsed ; dyspnœa.	Calomel, Nitric Acid, and Chloroform.
„ 26	1	...	33	14 „	6¼ „	...	1	do violent cramps.	do Arrack.
„ 27	...	1	25	2½ days	2 days	...	1	Deeply collapsed ; never rallied, coma.	do do
„ 29	...	1	48	2¼ „	2 „	...	1	Not collapsed, but became so rapidly, coma.	Chlorodyne, Calomel, Chloroform.
„ 29	...	1	22	22½ hours	17 hours	...	1	Collapsed, cramps, dyspnœa.	Calomel and Chloroform.
„ 29	1	...	40	7 days	7 days	1	...	Collapse.	Calomel and Ether.
Aug. 1	1	...	17	24 hours	22 hours	...	1	Collapsed, very restless.	Calomel and Salt drink.
„ 1	1	...	11	8 days	7½ days	1	...	Collapse.	Calomel grs. v. Saline.
„ 7	1	...	17	30 hours	13 hours	...	1	Collapse, dyspnœa, coma.	Saline.
„ 8	1	...	70	24 „	9 hours	...	1	Collapse ; picked up in the street, starved.	Calomel. Saline. Food.

Table II. continued.

NATIVES.—(continued.)

Date.	Sex. M.	Sex. F.	Age. Yrs.	Duration of Disease from commencement to termination.	Time in Hospital.	Results. Recovered.	Results. Died.	Condition on admission; concomitant symptoms.	Treatment.
Aug. 10	...	1	48	2 days	22 hours.	...	1	Collapsed, cramps.	Saline, Stimulants.
" 12	...	1	35	10½ "	10 days	1	...	Collapse, no cramps.	Saline, do
" 12	...	1	6	11 "	10 "	1	...	Collapse, speedy rallying.	Saline, Food.
, 13	1	...	38	7 "	7 "	1	...	do do	Saline, Stimulants.
" 14	...	1	6	12 hours	3½ hours	...	1	Deeply collapsed, coma.	Salt emetic, Calomel.
" 17	1	...	30	5 days	3 days	1	...	Not Collapsed.	do Saline.
" 19	1	...	35	23 hours	17 hours	...	1	Deeply collapsed, starved, Hospital toty, but never in cholera ward, coma.	do do
" 20	...	1	23	10 days	10 days	1	...	Collapsed, found lying in the street.	do and drink.
" 21	...	1	16	5 "	4½ "	1	...	Collapsed.	do do Calomel.
" 21	...	1	35	12 hours	7 hours	...	1	do no rallying.	Salt emetic, Stimulants, Calomel
" 22	...	1	30	4¼ days	3½ days	1	...	Partial collapse.	do Calomel.
" 23	...	1	17	16½ hours	12 hours	...	1	Collapsed, cramps, dyspnœa.	do do Stimulants.
" 23	...	1	25	6¼ days	6 days	..	1	Collapse, rallied, relapse, coma.	do do do Blisters.
" 24	...	1	26	16¾ "	16 "	1	...	Partial collapse.	do do do
" 24	1	...	8	4¾ "	4 "	1	...	do. passed worms.	do do do

Table II. continued.

NATIVES.—(continued.)

Aug. 25	...	1	13	15 days.	15 days.	1	..	Collapsed, coma.	Salt emetic, Stimulants, calomel, Rhubarb, Blisters.
„ 26	1	...	35	8 hours	½ hour	...	1	Collapsed.	Nothing.
„ 26	1	...	33	21 „	11 hours	..	1	do. cramps, dyspnœa	Saline and Calomel.
„ 27	.	1	50	24 days	24 days	1	...	Partial collapse, ptyalism.	Calomel and Saline.
„ 28	1	...	5	16 hours	7 hours	...	1	Deeply collapsed.	do do
„ 29	1	...	58	Unknown	6½ „	...	1	do never rallied.	do do
Sept. 1	...	1	16	14½ hours	12 „	...	1	do do	Salines.
„ 2	1	...	2	15½ days	15 days	1	...	Collapsed, passed worms.	Saline.
„ 3	...	1	35	6 „	5½ „	1	...	Collapsed.	do
„ 4	...	1	20	17 „	17 „	1	...	do very delicate.	do Rhubarb.
„ 14	...	1	4	10 „	10 „	1	...	Partial collapse.	Food.
„ 16	...	1	40	19 „	9 hours	...	1	Collapse, cramps.	Essence of Omum.
„ 18	1	...	29	12 „	11 days	...	1	Partial collapse, rallied, on 7th day coma set in.	Salines and Stimulants. Purgatives, Blisters.
„ 18	1	...	35	33 hours	11 hours	...	1	Collapsed, bruise on head, dyspnœa.	Saline.
„ 22	...	1	25	10½ „	3½ „	...	1	Collapse, cramps.	do
„ 22	1	...	48	5¼ days	5 days	1	...	Not collapsed.	do emetic, Hot drinks.
„ 23	1	..	28	11 hours	6¾ hours	...	1	Deeply collapsed, cramps.	do
„ 23	1	...	10	6½ days	6 days	1	...	Collapse.	do emetic, Food.
„ 23	1	...	35	11¼ „	11 „	1	...	Deeply collapsed.	do Food, Dry cupping.
„ 25	1	...	35	Unknown	5½ hours	...	1	Deeply collapsed, severe cramps, dyspnœa, starved.	do
„ 26	1	...	24	4 days	8 „	...	1	Deeply collapsed, severe cramps, dyspnœa, starved; treated at Native Infirmary for 3 days.	do Stimulants.

Table II. continued.

NATIVES.—(continued.)

Date.	Sex. M.	Sex. F.	Age. Yrs.	Duration of Disease from commencement to termination.	Time in Hospital.	Results. Recovered.	Results. Died.	Condition on admission; concomitant symptoms.	Treatment.
Sept. 26	...	1	20	13 days.	11 days	1	...	Partial collapse; retention of urine; drowsiness.	Food, Hot mulled port, Cathetersm.
„ 28	1	...	35	38 hours	27 hours	...	1	Deep collapse, exhaustion.	Saline.
„ 28	1	...	36	3 days	3 days	1	...	No collapse, vomited worms.	do
„ 28	1	...	50	$12\frac{1}{2}$ „	12 „	1	...	Deep collapse, starvation.	do Hot Arrack and water.
„ 28	1	...	3	10 „	10 „	1	...	Collapse, passed worms.	do
„ 30	1	...	$1\frac{1}{6}$	4 „	$3\frac{1}{2}$ „	1	...	Partial collapse.	do Wine and water, hot.
Oct. 7	...	1	35	Unknown	6 „	1	...	Very feeble.	do Hot Arrack toddy.
„ 8	...	1	60	2 days	$46\frac{1}{2}$ hours	...	1	Deep collapse, no rallying.	Salines, Hot Brandy and Water
„ 14	...	1	25	$4\frac{1}{2}$ „	4 days	1	...	No collapse, rice water purging and vomiting.	Chlorodyne, Food.
„ 16	...	1	8	8 „	8 „	1	...	Partial collapse.	Saline and Spts. Chloroformi.
„ 18	...	1	10	$12\frac{1}{4}$ „	12 „	1	...	Deeply collapsed, coma.	Hot Arrack toddy, Rhubarb, Pot Chloras and Quinine.
„ 20	...	1	4	Unknown	2 hours	...	1	do no rallying.	Acetic Acid.
„ 25	1	...	70	10 days	$9\frac{1}{4}$ days	1	...	Collapsed, starved.	Chlorodyne 3 doses, Saline.
„ 29	1	..	15	10 hours	$3\frac{1}{2}$ hours	...	1	Deeply collapsed, coma, no rallying.	Saline.
„ 31	1	...	41	7 days	5 days	1	...	Partial collapse, Starvation.	do Hot stimulants.
Total...	38	33				36	35		

Meteorological Condition *of Madras previous to, and during the continuance of, the Epidemic.*

The diagrams drawn up by Dr. Arnold Smith and attached to the *Madras Mortuary Reports* which are printed in Nos. 19 and 20 of this Journal will afford all the information needed on this point. During the first half of the year the *temperature* was much above the average; the maximum in the second week of June was 106°, being 10° above the average. From March the *velocity of the wind* was much above the average. The per-centage of *humidity* and the *rain-fall* were much below the average, and there was a general absence of thunder-storms. Just previous to the outbreak very hot winds blew with great violence from the western quarter, and several dust-storms, not followed by rain, occurred. For three consecutive days at the beginning of July, Madras seemed to be almost continuously enveloped in an atmosphere of dust reaching to a considerable height.

During the continuance of the epidemic, the *Barometer* showed but little variation from the average atmospheric pressure. The *Humidity* was from 4° to 7° below the average of the last 20 years. The *Rain-fall* was very deficient; up to the end of June only 0·316 of an inch had fallen during the year—a deficiency of 6·35 inches; up to the end of September, 8·96 inches had fallen, being 10·73 inches below the average; and up to the end of October 17·66 inches had fallen, being 14·98 inches less than the average. The *Temperature* was very high during the entire period; varying from 2° to 4° above the average. The *Velocity of the Wind* was unusually great; its *Direction* from the second week of June to the middle of October was principally from the South-west, subsequently from North by East.

Localities *from which the patients were brought to Hospital.*

Districts of Black Town	21
John Pereira's	19
Poodoopettah	14
Chintadrepettah	13
New Town	13
Neighbourhood of Pursewaulkum	6
Fort St. George	6
Unknown (chiefly strangers recently arrived at Madras, and persons picked up in the streets)	22
Total	114

The Influence of Season *on the Prevalence and Fatality of the Disease.*

TABLE III, *showing the number of Admissions, Recoveries and Deaths in each of the four months during which the epidemic influence prevailed.*

Months.	Europeans.			Eurasians.			Natives.			Total.			Percentage of total	
	A.	R.	D.	A.	R.	D.	A.	R.	D.	A.	R.	D.	Recoveries.	Deaths.
July............	4	0	4	7	5	2	16	6	10	27	11	16	40·75	59·25
August............	7	6	1	12	7	5	25	12	13	44	25	19	56·82	43·18
September........	1	0	1	6	4	2	21	12	9	28	16	12	57·14	42·6
October...	4	4	0	2	0	2	9	6	3	15	10	5	66·66	33·33
Total.....	16	10	6	27	16	11	71	36	35	114	62	52		
Percentage of Recoveries.	62·50			59·26			50·71			54·386*				
Do. of Deaths.	37·50			40·74			49·29			45·614*				

The above table shows that the late outbreak did not generally depart from the well-known law of epidemics, more marked perhaps as regards cholera than other affections, that on the first onset of the disease a large proportion of the cases die, that the proportion of fatal cases gradually diminishes, and that, as the epidemic influence declines, the cases become milder and the greater number recover. The table further shows that this general law was more strictly observed among the European and Native races than among the Eurasians, as regards whom it was but imperfectly followed. The limited number of cases embraced in the table may account for this. I shall have to allude again to this law when speaking of the

* The per-centages of the total recoveries and deaths here given are strictly accurate, and are not arrived at, as is usually the case, by dividing the sum of the per-centages given by the number of instances given. The latter procedure would have shown a more favourable total percentage than was actually the case. Thus 62·50 + 59·26 + 50·71 = 172·47, and 172·47 ÷ 3 = 57·490 instead of 54·386; and 37·50 + 40·74 + 49·29 = 127·53, and 127·53 ÷ 3 = 42·510 instead of 45·614.

results of treatment, and I think it right to mention here that I fully recognize that any deductions drawn solely from the limited number of cases admitted into the General Hospital, must be liable to the corrections which a far more extended experience may absolutely enforce.

TABLE IV, *showing the total number of Admissions, Recoveries and Deaths of each Sex of the three Races treated during the epidemic, with percentages of recoveries and deaths.*

Race.	Admitted.		Recovered.		Died.		Percentage of			
							Recoveries.		Deaths.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females	Males.	Females.
Europeans.	14	2	9	1	5	1	64·28	50·00	35·72	50·00
Eurasians...	16	11	9	7	7	4	56·25	63·64	43·75	36·36
Natives.....	38	33	19	17	19	16	50·00	51·52	50·00	48·48
Total...	68	46	37	25	31	21	54·41	54·35	45·59	45·65

The Influence of Sex.—Some authors assert that sex has an influence on cholera, that fewer females are attacked than males, and that females die in greater proportion than males, in consequence of their less powers of resistance to disease. We have no proof that females suffer less than males. The fact that as regards Europeans and Eurasians, fewer women than men are admitted into hospital, is no criterion by which to judge of the proportion of attacks in the two sexes, and table IV shows that there is but very little difference in the percentage of mortality in the two sexes under hospital treatment.

The Influence of Race.—From table III it will be observed that, in respect of the three races, the results were the most favorable as regards Europeans, next as regards Eurasians, and least favorable as regards Natives. And from table IV it may be learnt that the recoveries in the six classes treated were favorable in the following order :—1. European

males; 2. Eurasian females; 3. Eurasian males; 4. Native females; 5 and 6, European females and Native males. I consider it would be absurd to argue from a series of 2, or of 16, or of 27, cases of such a disease as cholera; so I lay no stress whatever upon these particular results, but prefer to look only to the total, and I find that—

General Mortality:—the General Hospital cases give a percentage of recoveries of 54·386, and of deaths of 45·614. I have no desire to contrast these percentages with those which have been attained by other practitioners. I am quite aware that compared with results published in order to illustrate the efficacy of particular methods of treatment, my total percentages are very unfavorable.

Thus Dr. Mudge* gives the result of his treatment by turpentine emulsion, in a period of eighteen months, as 69 cases treated, 42 recoveries and 27 deaths; affording a percentage of 60·87 recoveries and 39·13 deaths.

Dr. Donaldson,† by a combination of stimulants, antacids, opiates, sedatives and astringents, saved 12 out of 18 cases.

Dr. Mackay‡ reports six successive recoveries under a disinfecting treatment, principally by solution of chlorinated soda.

Mr. Evezard§ reports an extraordinary success with from half a drachm to a drachm of undiluted Condy's fluid diffused through half a tumblerful of water and given every half-hour. His report gives fifteen successful cases and one unsuccessful case; but I am not aware of what his subsequent experience may have been.

[As I shall not have occasion to allude to this method of treatment again, I may here state that, in obedience to the orders of the Principal Inspector General, I tried Condy's fluid, according to Mr. Evezard's instructions, in

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* Madras Quarterly Journal of Medical Science. Vol. vi. page 442.

† *Treatment of Asiatic Cholera.* Reprinted from Edinburgh Medical Journal, Dec. 1863. Gantz Brothers, Madras.

‡ Madras Quarterly Journal of Medical Science, Vol. vi., page 451.

§ Do, Do. Do. Vol. vii., page 341.

five successive cases, all of which proved fatal. I must confess that I was not hopeful of success, for I knew that Condy's fluid is a powerful destroyer of organic tissue.

In *The Lancet* for August 25th, 1866, page 219, I find the following in an article headed *Cholera Correspondence.*

"Mr. W. Whitehead (Mansfield, Woodhouse) suggests a trial in cholera of 'the injection into the circulation of either chlorate of potash or permanganate of potash. The injection of medicinal agents,' he adds, 'in cases of cattle-plague was so far encouraging to me, that, I believe, had the new regulations permitted my continuing experiments, I could have brought them to a successful conclusion'."

I trust that the injection of permanganate of potash into the circulation of human cholera patients will not be rashly performed,—will never be undertaken until ample experiment has been made upon the lower animals. As Professor of Anatomy at the Medical College a few years ago, I caused a subject to be injected with Condy's fluid diluted with fifty times its weight of water, and the result was an immediate decomposition of the tissues, the muscles becoming green and putrid, and the subject totally unfit for dissection.

It may be said that this only proves the power of the permanganates in oxydizing and destroying *decaying* animal tissue. But if any one in the habit of using the microscope will experiment, with solution of the alkaline permanganates, upon foul water, he will find that the first effect is the destruction of putrefactive matters whether of a vegetable or animal origin, but that the action does not cease here. Living beings are attacked and in a special order too; first, the infusoria, polygastria, &c., and then the small entomostraca;—all will succumb if the dose be sufficient. Is it not a perfectly natural conclusion that the blood globules would be destroyed by the permanganate? and if so, could they be supplemented by a new generation with sufficient rapidity to support life? Could it be possible for the dose of permanganate to be so apportioned as merely to destroy the supposed (?) germs of cholera, without exercising any injurious influence upon the blood?]

From the *Satistical, Sanitary and Medical Reports of the Army Medical Department,* I find the following were the numbers of admissions and deaths from cholera among the

British Troops serving in the three Presidencies of India, in the following years :—

Years.	Bengal.			Madras.			Bombay.		
	Ad-mitted	Died.	Percentage of Deaths.	Ad-mitted	Died.	Percentage of Deaths.	Ad-mitted	Died.	Percent-age of Deaths.
1860	953	528	55,404	84	37	44,048	181	105	58,011
1861	1,423	880	61,841	70	29	41,428	48	35	72,876
1862	520	326	62,688	88	46	52,273	78	55	70,513
1863	232	157	67,672	119	47	39,496	12	8	66,666
Total..	3,138	1,891	60,261	361	159	44,044	319	203	63,636

The Bombay and Bengal mortality appears high, especially when contrasted with that of Madras. As we cannot for a moment admit that there is any superiority as regards treatment in the latter Presidency, or any error in the returns, we must conclude either that the disease was of a milder form, or that the condition of health and power of resistance to disease were greater during these years among the Troops serving in Madras than among those serving in the other Presidencies. It will be observed that the mortality among the Madras British Troops from cholera in the above years closely approximates to that met with among all classes of patients in the General Hospital during the past four months.

Coming to more recent statistics and confining observations to the epidemic of 1866, I am informed that Dr. vanSomeren's experience at the Native Infirmary affords results still less favorable than mine, viz., 123 cases with 52 recoveries and 71 deaths, a percentage of recoveries of 42·277 and of deaths of 57·723. I feel perfectly satisfied that these results are amply accounted for by the fact that by far the majority of Dr. vanSomeren's patients were old, worn-out, half-starved, diseased persons from the Monegar Choultry, &c., or persons whose powers of resistance to disease were at the lowest ebb ; whereas many of my patients were persons in the prime of life and with fair vigour of constitution. See table VI.

Here I enter some notes I have taken of Cholera mortality from reports recently published in the London journals.

From *The Lancet*, August 18th, 1866 :—

The Cholera in Holland, August 1866.

Towns.	Attacks.	Deaths.	Percentage of Mortality.
Amsterdam..........	608	560	92·105
Leyden..............	1,321	878	66·449
Granaphaya	1,371	775	56·455
Delft..................	638	397	62·225
Schiedam............	347	227	65·418
Rotterdam...........	1,595	994	62·319
Gonda................	• 244	139	56·967
Utrecht..............	2,148	1,464	68·156
Derdrecht............	578	358	61·937
Kempen...............	396	226	57·070
Meppel................	319	193	60·533
Gröningen............	1,527	863	56·516
Total...	10,484	6,514	62·132

As I imagine that there must be some mistake in the Amsterdam returns, I have omitted them from the total.

From *The Medical Times and Gazette*, Sept. 29th, 1866 :—

The Cholera in Nine Provinces of Belgium, to August 21st, 1866.

Province.	Cases.	Deaths.	Percentage of Mortality.
Antwerp.............	6,956	3,575	51·394
Brabant...............	6,597	4,034	61·149
West Flanders......	666	402	60·360
East Flanders.......	5,994	3,426	57·157
Hainaut..............	4,230	1,581	37·375
Liege..................	4,919	2,787	56·657
Luxemburg..........	1,084	577	53·229
Limburg..............	131	57	43·511
Namur................	574	260	45·418
Total...	31,151	16,699	53·606

From *The Medical Times and Gazette*, Sept. 8th, 1866:—
Cases admitted into the Cholera wards of the London Hospital, from the outbreak to Sept. 6th, 1866.

Admissions..............	515
Recoveries...............	196
Deaths.....................	272
Remain....................	47

Assuming that the 47 remaining cases all recovered, this gives a percentage of mortality of 52·801.

I have not met with any reports of cases admitted into the other London Hospitals, nor of any statistics showing the proportion of deaths to attacks in the whole of the metropolis. The latter, I presume, are not to be obtained, as the Registrar General only records the number of deaths from and not the number of attacks of disease.

The object of referring to these percentages here, is to show:

1. That the late outbreak of cholera has been a very severe and fatal one;

2. That cholera mortality—and equally the effects of remedies—is not to be judged of by the results of a few cases only; in other words, that the value of statistical tables, generally, is in proportion to the largeness of the numbers they embrace.

In order to illustrate this, I have collated the percentages I have alluded to, in the following table.

Authority.	Cases.	Percentage of mortality.	Authority.	Cases.	Percentage of mortality.
Dr. Mackay........	6	0·000	London Hospital	515	52·801
Mr. Evezard......	16	6·250	British Troops in India.......	3,818	59·0[illegible]9
Dr. Donaldson...	18	33·333	Holland..	10,484	62·132
Dr. Mudge........	69	39·130	Belgium.........	31,151	53·606
Genl. Hospital...	114	45·614			
Native Infirmary	123	57·723			

Further, I would remark, that the value of statistics of treatment and its results is very much enhanced by a kind of classification of the cases, and by a careful comparison of their severity at the time they first come under observation. And this leads me to notice,—

The Condition of the patients on admission—as recorded in the Hospital "Cholera Register", which is carefully written up (at half-hour or shorter intervals, during the continuance of the severer symptoms,) by the Apothecary on duty.

TABLE V., *showing the Condition on Admission into the General Hospital, Madras, of the* 114 *patients treated during the epidemic.*

Condition on Admission.	Cases.	Recovered.	Died.	Percentage of Recoveries.	Percentage of Deaths.
Deeply collapsed.....................	27	3	24	11·111	88·889
Collapsed with severe cramps......	20	6	14	30·000	70·000
Collapsed without cramps..........	30	21	9	70·000	30·000
Partially collapsed.....................	22	20	2	90·909	9·091
Not collapsed with cramps.........	6	4	2	66·667	33·333
Not collapsed and without cramps.	9	8	1	88·889	11·111
Total...	114	62	52	54·386	45·614

The figures given in this table appear to support the conclusion :—

1. That cholera cases treated in hospital are fatal in proportion to the severity of the symptoms on admission ;

2. That cholera cases, in general, are fatal in proportion to the completeness of the collapsed condition.

This may not be so apparent to others from the classification I have made, as it is to me, for the mortality among the cases "partially collapsed" when admitted, is shown to be less than that among those "not collapsed with cramps" and those "without either collapse or cramps." But here, again, I would remark that the numbers embraced in the latter two classes are not sufficient to permit of any correct deductions. And we must acknowledge one disturbing cause as to the first conclusion, viz., that some cases in which the symptoms on admission are comparatively mild do subsequently pass into collapse, or into coma from either effusion on the brain or from uræmic poisoning.

3. The table fairly shows that the great majority of cases admitted into a General Hospital are of a severe character.

The Influence of Age.—The following table appears to me to have some interest attaching to it.

TABLE VI. ***showing the Age of* 114 *Cholera patients treated in the General Hospital, July* 4*th to October* 31*st*, 1866.**

	Europeans.			Eurasians.			Natives.			Total.			Percentage of total		
	A.	R.	D.	A.	R.	D.	A.	R.	D.	A.	R.	D.	Admissions.	Recoveries.	Deaths.
Under 5 years.	...	...	...	5	2	3	5	4	1	10	6	4	8·772	60·000	40·000
From 5 to 10 „	...	...	...	4	3	1	5	3	2	9	6	3	7·895	66·667	33·333
„ 10 to 15 „	...	...	...	5	1	4	5	5	0	10	6	4	8·772	60·000	40·000
„ 15 to 20 „	1	0	1	2	1	1	6	1	5	9	2	7	7·895	22·222	77·778
„ 20 to 25 „	1	1	0	3	2	1	6	4	2	10	7	3	8·772	70·000	30·000
„ 25 to 30 „	1	1	0	5	5	0	13	4	9	19	10	9	16·666	52·632	47·368
„ 30 to 35 „	3	1	2	2	1	1	4	2	2	9	4	5	7·895	44·444	55·556
„ 35 to 40 „	...	...	...	...	...	...	13	6	7	13	6	7	11·403	46·154	53·846
„ 40 to 45 „	1	1	0	1	1	0	5	3	2	7	5	2	6·140	71·428	28·572
„ 45 to 50 „	4	3	1	...	...	...	3	2	1	7	5	2	6·140	71·428	28·572
„ 50 to 70 „	5	3	2	...	...	...	4	1	3	9	4	5	7·895	44·444	55·556
Above 70 „	...	...	...	...	...	...	2	1	1	2	1	1	1·754	50·000	50·000
All ages ...	16	10	6	27	16	11	71	36	35	114	62	52	100·000	54·386	45·614

To make this table of any real use we need statistics which are not at present available, so far as Madras is concerned, viz., the number of individuals living at the ages embraced in each of the above quinquennial periods.

An examination of table VI. shows that no age is exempt from the disease. The hiatus up to 15 years in the European column is accounted for by the fact that there are few pure European children among the class of patients seeking admission into the General Hospital,—their young swell the numbers of the Eurasian column. From 15 to 45 years there were 7 Europeans admitted, and from 45 to 60 there were 9 admitted. Again, I ask, what are the relative numbers of European residents of Madras at these ages? The want of admissions of Eurasians above 45 years of age is, I think, accounted for by the fact that the number of living persons of this race above 45 years of age is comparatively small. I have no wish to argue from my table, but I can but think that the column of percentages of admission at the different ages bears, as regards adults, a very close correspondence to the proportion of living persons at these ages.

The Constitutional condition of the persons attacked. It has been stated that "vigour of constitution predisposes to cholera," and that "it is seldom, comparatively speaking, that we hear of an old man or woman being attacked with the disease."

These statements are founded principally upon Army statistics leading to the conclusion that "the older soldiers have been less frequently attacked than the younger men."

However it may be with European soldiers, until sufficiently comprehensive and conclusive statistics shall be produced to disprove the belief, I must hold the opinion that we have no proof that vigour of constitution predisposes to cholera, so far as the general population is concerned. I feel sure Dr. vanSomeren will support me in the belief that during the late epidemic, the number of attacks has been increased and the mortality augmented, by the high price of food-stuffs which has ruled in Madras during the last few months. Many of my patients were in the most wretched state of emaciation from privation. I observe that Dr. vanSomeren reports 35 admissions from the Monegar Choultry with 24 deaths, 22 of which occurred in persons above the age of 45 years, and, of the latter number, one-half (*i. e.* 11) were above the age of 55. It is seldom that we see a vigorous native above the age of 45 years, and almost all natives above 55 years might be included in one grand class, headed *Senectus*. *See Appendix* 1.

The Epidemic. *Primary Symptoms.*—In very few cases was there any history of premonitory diarrhœa, and when this did occur it was of no long continuance. The peculiar rice-water discharges, and the suppression of urine, in most instances, set in without any previous diarrhœa, and, in my experience, this is most frequently the case in tropical cholera. Table V. shows that two-thirds of the cases (77 in 114) passed into complete collapse, and that nearly two-thirds of the remainder (22 in 37) became partially collapsed. Very commonly in the deeply collapsed cases there were no discharges from the bowels during the continuance of this state. But it was frequently pointed out to the clinical class that, by a little careful palpation of the abdomen, it became quite evident that, although there were *no discharges from* the bowels, there was abundant and increasing *transudation into* them. In most cases the intestines

appeared quite full of fluid matters before death occurred, and in some a considerable post-mortem flux happened.

One successful case was a second attack during the year; the patient, a half-witted Eurasian, having had a previous attack in February last.

In one case only was there a relapse; a Eurasian youth recovered so completely from the primary attack, as to be removed into the convalescent ward; but about sixty hours afterwards the symptoms re-appeared with great violence; he fell into complete collapse with urgent dyspnœa, and died after sixteen hours severe suffering.

Secondary Phenomena observed. *Coma.*—Sixteen of the 114 patients fell into a comatose condition; about two-thirds of this number into deep coma. Of the 16 cases, 11 proved fatal. Two were brought in comatose; this condition supervened soon after admission in 5 cases, and proved fatal in from 3½ to 23 hours; in 2 cases, in 2 days; and in 2 cases coma set in about the 7th day and proved fatal on the 11th and 12th days respectively. Five of the 16 cases recovered, the coma set in from the 4th to the 7th day and the recovery was complete on the 10th, 11th, 12th, 15th, and 20th days respectively. In some of these and in several other cases (not shown in table II.) a comatose condition supervened upon apparent recovery, the secretions having become quite restored and natural; but, in all, suppression of urine again occurred, followed by giddiness, headache, injected conjunctivæ, stupor and coma.

Urgent dyspnœa, was present, according to table II, in 16 cases; all terminated fatally. I do not think that this represents the full number of cases in which this symptom was present, but only those in which it was observed early and was very urgent. In many of the fatal cases the mode of death was by apnœa; difficulty of breathing coming on shortly before the cessation of life. I have read Dr. G. Johnson's work and his explanation of this symptom, viz., spasm of the ultimate branches of the pulmonary artery. That this and collapse of the lung was the pathological condition in some of my cases I have no doubt, but in several it appeared to me that the dyspnœa arose from pulmonary hypostasis; while in not a few, I am convinced it was the result of spasm of the diaphragm, for the respiration was purely costal, principally costo-superior, the abdominal muscles were tense and unmoved, and the suffer-

ers complained of violent cramps in the epigastrium and under the margins of the ribs, and the dyspnœa was continuous.

Eruptions.—I cannot say that every patient was carefully examined for eruptions. Two cases presented some roseolous patches on the thorax and fore-arms, and one a rather extensive eruption of erythema punctatum,on all parts of the trunk and limbs.

Pregnancy.—Two women were admitted at near the full term of pregnancy. One had been ill twenty-four hours before coming to hospital; she was delivered of a still-born child an hour after admission; rice-water purging and vomiting continued for some hours without the patient falling into collapse, and she recovered. The other woman recovered from cholera and on the evening of the sixth day, she being then convalescent, labour-pains set in—and she was sent to the Lying-in Hospital. I ascertained frequently during her illness, and shortly before she left, that the fœtal heart was beating vigorously, but I heard that she was delivered within two days of a dead child.

Dr. Harris, superintendent of the Lying-in Hospital, pointed out to me the impropriety of sending a woman recently recovered from cholera to the Lying-in Hospital for delivery, as she might be a source of infection and a puerperal fever be generated in the wards. Fully acknowledging the propriety of avoiding any *chance* of such infection, I promised Dr. Harris that I would not err in this respect in future, but should a similar case occur I would make arrangements for the accouchement to take place in the General Hospital, ill-adapted as that institution is for any such purpose. I am happy to be able to state that in this one instance no bad results happened. Referring to the Lying-in Hospital, I am reminded that a case of cholera arose in that institution in July, in a young Eurasian woman who had been delivered seven or eight days. She was transferred to the General Hospital and died collapsed in a few hours.

Lactation.—Several lactating women came under treatment; some a few days after delivery. The secretion of milk was not arrested in any one of them, and most of them suffered severely from distension of the mammæ, and recourse was had to belladonna liniment to "disperse the milk."

One woman, unknown to me at the time, suckled her child during her entire illness, without any ill-effects happening to the infant.

Menstruation.—Several women menstruated immediately upon recovery; some stated that the period was anticipated, some that it was delayed, the menses having been irregular previously, in one case absent for four months. One girl menstruated for the first time after recovery from a comatose condition.

Hæmorrhage.—I have not noticed any hæmorrhage from the bowels or vagina. Epistasis occurred in one case only, viz., the last case of recovery from coma. This led me to remark to the clinical class that in future, I should apply a leach to each nostril in those cases in which coma occurred.

The Question of the Contagiousness of Cholera. Dr. Aitken * says:—" It is curious that in India, the birth place and head-quarters of the disease, the doctrine of contagion is almost universally disbelived in by our professional brethren. The opinion generally entertained in India is opposed to the doctrine of contagion." Dr. Aitken's work shows him to be so industrious in collating the opinions of different writers,that it is probable that he has examined the writings of a sufficient number of authors to enable him to make the above statement. I have neither leisure nor sufficiently extensive materials at command for verifying or disproving it, but until I read the above, my belief was that the greater number of practitioners in India were contagionists. However there is much to be said on both sides of the question. We almost always have the disease amongst us—it is endemic in Madras—and yet we do not find any great fluctuation in the number of deaths from cholera until an epidemic influence is impressed upon the disease. Were the disease eminently contagious we might expect, knowing how fatal it is, that where endemic there would be a rapidly increasing, instead of a tolerably steady mortality from it, and that sporadic cases of cholera would never be heard of. For every person suffering from the disease would necessarily become a focus of contagion, and we know of no protecting power against cholera, in the way that vaccination is

* Science and Practice of Medicine, 2nd ed. vol. i, page 649.

protective against small-pox* or as one attack of the exanthemata or whooping cough is protective against a second attack. Many observers, Mr. John Simon, Dr. W. Budd, Dr. Bidie, &c., have insisted upon the infectiousness of cholera discharges ; and the way in which an encamped Regiment becomes attacked when unfortunately halted upon ground which has previously been occupied by an infected camp would seem to be conclusive that, at a certain stage of decomposition, cholera discharges are infectious.

I here mention certain facts which have come to my knowledge during the late epidemic, and which may be differently interpreted by different persons.

1. A man, his wife, three children, and two servants, resided in a house in Poodoopettah, where cholera was raging. One child was attacked and recovered ; a second was seized and died at home ; the maty-boy was seized, brought to hospital collapsed, and died ; the father was attacked the same day, brought to hospital and recovered ; the daughter was brought in the next morning, and the ayah in the afternoon, the former recovered, the latter died. The wife only escaped the disease. It may be said that these attacks occurring within a few hours of each other resulted from the patients receiving, at one and the same time, a dose of the poison of epidemic disease, and that this instance neither proves nor disproves the influence of contagion ; whilst the escape of the wife, who was assiduous in her attentions to the sufferers, would rather point to the non-contagiousness of the disease. I incline to this view.

2. Store-sergeant P. died in hospital of cholera, on June 15th. His widow and two children, with their trunks of clothes, &c., were received into the house of a brother-in-law, Conductor T., residing in Fort St. George. On July 17th Condr. T. was seized with cholera, other cases occurring in the Fort at the same time among the Rifles, the Artillery and their families ; he was brought to hospital and died. Immediately afterwards the family were moved from the Fort into Black Town. The next day the widow and two children were attacked. (They declined to come into hospital, so, by request, I superintended the treatment at their house ; all three recovered.) Mrs.

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* Mr. Blacklock has lately published his "impression" that small-pox and vaccination have a certain protective influence against cholera. He has never known a person deeply pitted or recently vaccinated die of cholera.

T. and her children were ministered to by her two sons, daughter, son-in-law, and servants, none of whom were attacked. The popular belief is that Mrs. P. conveyed the clothes her husband wore into the Fort,—though there is no evidence to show this,—and that Condr. T. was seized in consequence of these clothes acting as *fomites*.

3. About the same time a Serjeant of the Garrison Band, residing in the Fort, and his two children were seized on the same day with cholera and brought to hospital, the former died, the latter recovered. These persons were attended by many relatives, nine or ten at least; not one of whom was attacked.

4. A Store-serjeant, his wife and two children resided opposite the western gate of the Hospital. The infant was attacked with cholera and recovered. Two days after its recovery the elder child was attacked and died. The same day, the wife (alluded to above, under the head *pregnancy*, as having been delivered of a still-born child an hour after admission) was attacked; she recovered. The wife's father and sister, residing at Pursewaukum, came to the house to attend the funeral of the elder child. Next day both were attacked and brought to Hospital; the man recovered, the girl died. The Store-serjeant himself escaped. Many persons would consider that the wife's attack was the result of contagion. I am not prepared to deny this. I saw her with her clothes saturated with the discharges from her infant, and cautioned her on the subject. I can say nothing about the elder child, as I never saw it. It may be thought that the wife's father and sister also contracted the disease by contagion, but it is only right to mention that cases of cholera had previously been brought from Pursewaukum, showing that the epidemic influence was at work there.

5. Several of the regular ward coolies and several extra coolies have been engaged in close attendance upon the sick, assiduously rubbing them, &c, so that they must have been frequently contaminated by the cutaneous exudation and the discharges of the patients. One female attendant in particular performed her duties in the most praiseworthy manner, attending to the wants of the patients in every way both day and night. An extra sweeper was engaged and was constantly employed in removing, burying and disposing of the discharges and washing the patients' clothes, which were often saturated with evacuations. I am glad to say that not one

of these persons has had the slightest symptom of the disease. Under the head of *Treatment* I shall presently show that careful measures of disinfection were put in practice, and the immunity of these attendants may be partly due to this.

There are very many circumstances connected with cholera which it appears to me have not been brought forward in such a shape as to allow of correct conclusions being drawn therefrom,—and this not only as regards contagion, but also with respect to other matters, some of which have already been alluded to. But I do not hesitate to say that, as at present informed, I believe there is quite sufficient evidence, that cholera may be spread by human intercourse, but that it is much more often and much more extensively disseminated by means of that mysterious influence which, for want of a better name, we call epidemic. And further, I consider that those who hold the opinion that cholera is *eminently contagious* too often overlook the fact, that the disease has often originated, and may, with infinite frequency, again originate *de novo*, under local conditions of overcrowding, extreme heat, squalor, want, filth, and wretchedness of every kind. There is abundant proof that violent outbreaks of cholera have arisen from the use of putrid food; and that such food may be the determining cause of attacks when the disease is prevailing epidemically. Several of the cases, under review, were distinctly attributed by the sufferers themselves to the use of such food as bad fish, sausages, Madras pork, ill-ground and half cooked ragi, &c., and the first dejections of many of them contained half-boiled horse-gram.—*See Appendix* II.

Pathology.—This report has already extended to too great a length to render it convenient for me to enter at all upon this subject. All that I could say, however, would be but negative. It would occupy too much space and time to enter into the arguments which appear to me to be opposed to Dr. G. Johnson's views, or to the electrical theory which Mr. Wilkins* supports, or to some other theories which have been advanced. I am in hopes that Dr. Lionel Beale's investigations with the aid of the microscope furnished with an object class of one-fiftieth of an inch focus will be the means of throwing some light upon the pathology of cholera.

**The Etiology of Cholera,* Madras Quarterly Journal, No. 20 page 321.

Morbid Anatomy.—No post mortem examinations have been held of any of the cases occurring at the General Hospital. Many circumstances have conduced to this. The subjects are speedily removed and buried. The people in general are prejudiced against autopsies. The contagion theory is so far accepted, that medical subordinates and students are prejudiced against the performance of necroscopies. And lastly, the time at the disposal of a medical officer of the General Hospital, with a large clinical class to instruct, is so occupied with important and absolutely necessary duties, that he has no leisure for the prosecution of investigations which, under existing circumstances, must be considered of secondary importance and necessity. There are ample records of the general appearances presented by persons dead of cholera in all its stages, so that nothing less than very careful and minute examination would be of any avail. And there is no one at the General Hospital who, during an epidemic outbreak, would have leisure for such minute inspection; an argument in favour of the appointment of a Special Demonstrator of Morbid Anatomy.

Treatment.—An analysis of Table II furnishes the following results:

TABLE VII., *showing the result of different methods of treatment practised at the General Hospital, Madras, in* 114 *cases of Epidemic cholera, July* 4*th to October* 31*st,* 1866.

Mode of Treatment.	Cases.	Recovered.	Died.
1 Small, oft-repeated doses of Calomel with moderate stimulation	26	12	14
2 Do. do. after operation of a salt Emetic	12	5	7
3 Do. do. do. with saline Drink	16	10	6
4 Salt Emetic and saline mixture	30	17	13
5 Do. do. with hot stimulants	7	6	1
6 Food with hot stimulants	7	7	...
7 Acids; nitric, sulphuric and acetic	6	2	4
8 Chlorodyne, Omum, Sp. chlorof. and Opium	9	3	6
9 Nothing. (Died in 5 minutes)	1	...	1
Total	114	62	52

The above table taken by itself has such trifling value that I have not considered it necessary to strike the per-centages of recoveries and deaths. The information contained in this table is best taken first-hand from Table II, where the results of treatment may be contrasted with the state of the patient on admission, &c. And, further, it must be observed that these different methods of treatment were put in practice at different periods of the epidemic; those that appear most favourable having been practised chiefly when the epidemic was on the decline. And under the law of epidemic influence previously alluded to, it may happen that the favorable results have been less due to treatment, than to the natural tendency in epidemic outbreaks to a gradually declining severity of the cases and a consequent larger proportion of recoveries.

I proceed to notice these different methods of treatment in detail, so as to give my own impression as to the results.

Acids.—No. 7 in the table. These remedies were exhibited in but six cases; four of these were hopeless on admission. The other two were mild cases, one not collapsed, the other only partially so; in the latter, stimulants and nutritive enemata were combined with the acid. I have no faith in the remedial power of acids in confirmed cholera, but I have the greatest confidence in them when used to check diarrhœa, especially that flux which is so common just before, and during the continuance of cholera epidemics, and which is often called choleraic or choleroid diarrhœa.

In the cases just alluded to I am in the habit of using with the best effects from thirty to sixty minims of diluted sulphuric acid in two ounces of peppermint water, given every half hour, hour, or at longer intervals, according to the severity of the symptoms. Should much pain or griping be felt, from fifteen to thirty minims of tincture of opium are added to the first two or three doses. I first learnt the value of sulphuric acid in cases of this kind in 1852, when I was an attaché of the General Board of Health in London, for the purpose of studying cholera. A severe outbreak of cholera occurred at Luton, Bedfordshire, and I was requested by the late Mr. Grainger, a member of the Board, to associate myself with another medical man and proceed to the spot. We established a house-to-house visitation, and armed with bottles of sulphuric acid, laudanum and essence of peppermint, we visited all the houses of the poorer classes of the

population, the straw-plaiters, bonnet-makers, &c. &c., and we met with a vast number of cases of serous diarrhœa, every one of which yielded to this simple treatment; no case that I can recollect passed into real cholera; the outbreak of cholera was almost limited to the very unsanitary locality in which it arose; and in the course of about three weeks, we left the town, the populace being free from all disease. My experience during the last fourteen years has thoroughly confirmed that which I gained in 1852.

Chlorodyne, Omum, and Opium.—No. 8 in the table These remedies were used with success in three simple cases and without success in six apparently hopeless ones. I am not answerable for this treatment. The remedies were prescribed in my absence, it appearing to the Apothecary on duty that they were most suitable to the cases on admission. I have no faith in a simple stimulating and narcotizing treatment of cholera, though I fully acknowledge the greatness of the temptation to try such treatment when we see patients prostrated and in great agony. Except in very mild cases and early in the disease I think opium inadmissible. If given to any extent, it adds to the secondary symptoms, and in collapsed cases it appears to me to deepen that condition.

Calomel.—No. 1 in the table. The exhibition of small doses of calomel, from one to two grains every quarter of an hour, half-hour, or hour, till the symptoms yield, is a plan of treatment which has met with much success in the Civil Dispensary attached to the General Hospital, during the last few years. This treatment was put in practice, with less success, in the cases which occurred in the first half of the present year, and also in the first period of the late epidemic. Considering the general severity of the cases, the calomel treatment appeared to have a certain success. The drug was withheld immediately upon the appearance of biliary matter in the stools, and for a long time I attributed this appearance directly to the remedy, and I talked to my class of "mercurial purging." But subsequent experience led me to correct this notion, for I found that when no calomel was given the greenish biliary stools were the first indication of the disease having yielded, and were often speedily followed by a free flow of urine.

Emetics with Calomel.—Nos. 2 and 3 in the table. As I fancied that the treatment by calomel alone showed but a low per-centage of success, I combined it with the exhibition

of emetics, as recommended in 1832 by Dr. Ayre. Years since I had employed emetics as a commencement of cholera treatment, not with any view to elimination, but because I had observed (though by no means universally) two effects of emetics. First, I had seen distressing vomiting relieved—nay arrested, by one or two copious evacuations from the stomach ; and, secondly, I had certainly seen some patients aroused from a state of collapse on the production of free emesis. Formerly I used sulphate of zinc combined with ipecacuanha, then mustard, but in the present epidemic I used the following :—

℞. Sodii Chloridi ʒiii.
Liq. Sodæ Chloratæ ♏xxx.
Aquæ font. ℥iv. *M.*

to be given at once and repeated in quarter of an hour if it does not act. The above dose for an adult. When this dose was retained for any time, I thought I detected some subsequent beneficial action, so, still giving the calomel, I also administered the following after the emetic had acted freely.

℞. Sodii Chloridi ℥ss.
Liq. Sodæ Chloratæ ʒi.
Aquæ font. ℥xxiv. *M.*

Make a drink to be consumed, in small quantities at a time, in from twelve to twenty-four hours. Possibly about this time the cases were becoming milder, but it appeared that this treatment was affording a fair success. But so many of the patients suffered salivation after recovery from collapse, and I believed in greater proportion since I had used the above salines, that I determined to omit the calomel.

Emetics and Salines.—Nos. 4 and 5 in table VII. Every case was now treated on the following plan. On admission a salt emetic was given until it acted freely, and I may here state that this was almost always followed by a cessation of the vomiting. The following was then prescribed :—

℞. Sodii Chloridi grs. xxx.
Sodæ Carbonatis grs. xx.
Potassæ Bicarbon. grs. x.
——— Chloratis grs. x.
Sodæ Phosphatis grs. xv.
Liq. Sodæ Chloratæ ♏xx.
Aquæ font. ℥ii. *M.*

to be given every half hour to six or eight doses. I very

soon found I was giving the salines in too large doses and in too concentrated a form, so I reduced the dose from a fourth to an eighth of the above, diluted with an ounce of water. At first so many very bad cases recovered under this treatment that I was very hopeful of meeting with a large success, and if I had not had so prominently before me the fact that under the epidemic influence cases do gradually become milder and less fatal, I should have thought that this saline treatment was the most promising that I had met with.

Some failures then occurred, and as I had interdicted stimulants, I began to consider whether these latter might not be combined judiciously with the salines. I had seen no benefit from stimulants given in large quantities, or administered cold; so I gave small quantities in hot water sweetened. In some cases port-wine negus was given, but generally a dose of two or three drachms only of brandy, well diluted with hot water and sweetened with sugar, was administerted every two, three, or four hours. Under this treatment, *towards the end of the epidemic*, a marked success was met with.

Food with Hot Stimulants.—No. 6 in the table. Table VII would seem to show that this was the most successful of all the methods tried. But the cases are few and the treatment was practised late in the epidemic. Two of the seven cases were mild ones, five were tolerably severe, the patients being partially or completely collapsed; in one, coma supervened; yet all recovered. The kind of food employed was, in the first instance, hot arrow-root or sago congee and hot weak chicken broth; the stimulants were used in very small quantities, sometimes they were mixed with the broth and congee, sometimes given separately diluted with sweetened hot water. As recovery took place, solid food was cautiously and gradually given. The milk diet of the hospital afforded a useful method of gradually introducing solids.

Castor Oil.—I have tried castor oil, always without success. I have not before me the means of stating in how many cases of Cholera I have used this remedy, but it was exhibited in three of the cases under review; (it has been accidentally omitted from the treatment column of table II., in one of the earlier cases.) I find the oil whether given plain or in emulsion, nauseates the patients, and very often keeps up the vomiting. I am unable, as at present

informed, to appreciate the soundness of the theory which led to the suggestion of castor-oil as a remedy. I cannot believe that the cholera poison is to be eliminated by purgatives.

General Therapeutics. *The Use of Heat.* I have no experience of the cold douche, the hot-water bath, or hot vapour bath. The former appears to me inadmissible; I have no objection to heroic remedies, but I fail to comprehend how a person is to be restored from the collapse of cholera by a thorough drenching in cold water. We have no facilities at the General Hospital at present for the speedy preparation of hot water and hot vapour baths; but did they exist, it would require some tolerably certain evidence of the benefit of these baths before I could be induced to use them. I fear they would but add to the prostration. I certainly apply artificial heat, but only dry. My patients are well rubbed with the hand; turpentine being used as much to prevent the effects of friction as for its stimulating properties. The sufferers are then well covered with blankets, and bottles filled with hot water are applied to the feet, to the inner and outer sides of the thighs, to the sides of the thorax and to the axillæ.*

I am confident that very many of my patients derived very great benefit from the external application of dry heat. And I am afraid that the antiphlogistic theory still clings to us with such tenacity that we often neglect this very useful addendum to restorative treatment.—*See Appendix III.*

The Relief of Thirst.—There can be no doubt that urgent, unconquerable thirst is one of the most prominent and most distressing symptoms of Asiatic cholera. The sufferers are clamant for cold water, and we are told that it is "actual cruelty" not to indulge the craving. I am not sure about the cruelty. But I am sure that no amount of cold water will relieve the symptom : the water is greedily swallowed and again it is craved for : it is

> "As if increase of appetite had grown
> By what it fed on."

The fluid, if taken in large quantities, is immediately vomited, and if in smaller quantities, it accumulates in the stomach

* Since the above was written I have had tin cases made for the application of dry heat. They reach from the axilla to the hips and are hollowed on the face to fit to the lateral aspect of the thorax.

until the distension of the organ causes its rejection. And this keeping up of constant vomiting appears to me to increase the depression and collapse, without the patient being in the least relieved of thirst. I may be reminded that I have advocated the use of an emetic. This is quite true, but the full and efficient action of a speedily acting emetic, in my experience, controuls the vomiting, whereas large draughts of cold water keep it up. It is difficult to persuade oneself that the thirst of cholera is not to be relieved by cold water, or by sucking ice, but I have arrived at this persuasion. It is difficult also to persuade oneself that the internal burning heat of which patients complain is not to be relieved by iced-fluids; but I have arrived at this persuasion also. The thirst and internal burning heat disappear completely when the circulation and the secretions are restored, and it is my conviction that both are most relieved by small quantities of warm fluids, which may be either thin congees or weak broths, or well-diluted stimulants. Some time since I suggested to the authorities the advisableness of hospitals being supplied with tins of concentrated soup, which by dilution with hot-water, would afford a suitable nutriment very readily prepared on emergencies. The Principal Inspector General has ordered Indents to be sent in for supplies of Liebig's Extractum Carnis, and I believe that the nutritive properties of this preparation will be found of great avail in cases of cholera. The prepared soup should be given warm and well diluted, for concentrated preparations are not absorbed. When vomiting obstinately persists in spite of remedies, thirst may be greatly allayed by warm enemata of beef tea, or any broth, to which from a quarter to half an ounce of brandy and a drachm of the Liquor Sodæ Chloratæ have been added. I do not remember that any of the patients who were treated with the compound saline draughts previously referred to complained that these draughts increased their thirst. No particular notes are recorded on this point, but my impression is that the thirst was relieved, the vomiting being arrested. One would not have been surprised had an increase of thirst been experienced when these draughts were taken, considering the quantity of chloride of sodium which they contain. Most probably the carbonate of soda and bicarbonate of potash relieve the thirst.

The Treatment of Obstinate Vomiting.—I have already mentioned that I have generally found vomiting to cease

soon after the full operation of a speedily acting emetic. But this is not always the case, and, as the continuance of vomiting tends to deepen the prostration of the patient, it becomes necessary to endeavour to check it. The effervescing tartrate of soda, or citrate of potash, of ammonia, or of magnesia, will sometimes give relief. Two or three minims of Scheele's hydrocyanic acid may be added to each draught. When these means failed, which they often did, I found benefit from the following :—

℞. Creosoti ♏iv.
Sp. Chloroformi ʒii.
Acidi Hydrocyanici Diluti (Scheele) ♏ viii.
Syrupi ʒii.
Misturæ Acaciæ ℥ss.
Aquæ font. ℥iii. *M. ft. Mist.*
A fourth part every hour or two.

When vomiting continues, or recurs, after the secretions have been restored, it very frequently is associated with hiccup. I have tried various antispasmodics, both alone and combined with the above creosote mixture, and often have been much chagrined to find the symptoms persist. I have then pursued the following course, with success. A blister of two or three inches diameter has been quickly raised by the application of the liquor vesicatoria over the scrobiculus cordis. The cuticle has been immediately removed and the raw surface sprinkled with hydrochlorate of morphia, commencing with a sixth of a grain and gradually increasing the quantity whilst carefully watching the effects. Somnolence is frequently associated with these symptoms, so that this practice requires to be carried out with an intelligent caution.

Treatment of Suppression of Urine.—In many cases the renal secretion is not restored for some hours after the other urgent symptoms have passed off and the stools have afforded evidence that the suspension of the hepatic function has ceased. There can be no doubt as to the pathology of suppression of urine—congestion of the kidneys. Should the congestion continue after apparent improvement as regards the other symptoms, special treatment must be put in practice. Such mild measures as the application of sinapisms, hot fomentations, turpentine stupes, &c. may be tried; should they fail, dry cupping will often succeed. I have seen several patients pass their first few drops of urine since the

attack, whilst the cupping glasses were on the loins. Should dry cupping fail, I do not hesitate to apply the scarificator, and I have never known this to fail, provided the case was in an otherwise promising condition.

I have bled from the arm in a few cases; in two for general relief, especially of dyspnœa. In one case, then apparently moribund, I opened a vein in both arms and with great difficulty withdrew about five ounces of black, tarry blood; the patient died whilst the arms were being bandaged. In the other case the dyspnœa was decidedly relieved, and although the patient ultimately recovered, yet he suffered from marked symptoms of uræmia, and his convalescence was very prolonged. The latter case, with others which had occurred to me before, make me chary of general bleeding in cholera.

It behoves the practitioner to be quite certain that his patient is actually suffering from suppression and not merely from retention of urine. I always examine the abdomen, and if there is the least dullness elicited on percussing the hypogastric region, I use the catheter. In the case of a somewhat hysterical young woman there was prolonged somnolence, and I found the bladder quite distended: catheterism had to be resorted to twice daily for three or four days; it was in this case that an eruption of erythema punctatum was observed.

The Relief of Uræmic Symptoms, Somnolence and Coma.—These symptoms sometimes set in without the urinary secretion having been restored, and such cases are, for the most part, fatal. But sometimes they occur at a later period of the disease when the patient has been apparently progressing favourably. Under the latter circumstances the urinary secretion, which may have been quite freely passed, again becomes suspended, and the condition is very frequently attended with constipation of the bowels. There may be some warmth of skin, but in India it is seldom, according to my experience, that any decidedly febrile action occurs; the pulse generally is slower than in health. In these cases prompt treatment is absolutely necessary. To put faith in the *dolce far niente* theory—to trust to the unassisted powers of nature, is simply to allow the patient to pass from threatened, to certain, death. I think it well that the mind should be disabused of the idea that inflammation has happened in these cases; the condition is one partly of blood

poisoning and partly of congestion which, if not relieved, will certainly lead to effusion of serum. It appears to me then unnecessary to resort to calomel with a view to obtaining its antiphlogistic effects If there is any injection of the conjunctival vessels, with tendency to somnolence, the plan I pursue is to apply a cantharidine blister or the liquor vesicatoria to the nape of the neck, and hot fomentations or a hot epithem to the loins. If the bowels have not been moved for fully twenty-four hours, their action should be solicited. I do not think it matters what kind of purgative is selected, but I prefer from ten to thirty grains of rhubarb or jalap with from five to ten grains of chlorate of potash suspended in two ounces of any aromatic water. Should no action of the bowels occur in two or three hours, the dose is repeated, and its action quickened by the administration of a large injection of warm water with half an ounce of soap liniment and two or three drachms of tincture of assafœtida. I do not use turpentine because this drug has intoxicating effects upon some persons, and as we do not know how the patient may be affected as regards this idiosyncrasy, it is but prudent to guard against the chance of producing any such effect.* The bowels having been well cleared out, I either resume the cholera saline draughts, or give chlorate of potash and spirits of nitrous ether in moderate doses; to which, in suitable cases, small doses of quinine dissolved in hydrochloric acid are added.

If the patient has been taking solid food, this must be omitted, and congees and broths given in sufficient quantity to keep up due nourishment of the body. If the pulse is slow, soft and small, and there is a tendency to dryness of the tongue, moderate stimulation by alcohol is needed. But the question of when and how to give or withhold stimulants is one which can only be determined by the medical attendant watching the case, who must stand by prepared "to obviate the tendency to death." I am convinced that by such a line of treatment as I have here sketched, many persons have been restored from such a comatose condition as gravely threatened life.

The Relief of Dyspnœa.—I have tried various remedies with a view to the relief of dyspnœa. Externally, sinapisms,

* I have suffered from the intoxicating effects of turpentine, and the misery I endured has rendered me unwilling to submit others to the chance of similar suffering.

hot thinly-spread cataplasms, and turpentine stupes to the thorax. Internally, antispasmodics, stimulants, and sedatives, as valerian, ether, ammonia, hyoscyamus, &c. Certainly in many cases relief has followed, but I fear that the *post hoc ergo propter hoc* argument has had its influence in this matter, for the symptom has passed off in other cases in such a manner as to make me suspicious of how far my medicaments have ever relieved or removed dyspnœa. I must not mount a hobby, but I think the general influence of the saline draughts and the special influence of hot brandy and water have given relief to this distressing symptom.

Hygiene.—At the General Hospital the cholera patients are treated in a separate building completely isolated from the body of the hospital. This building is made of bamboo mats and is thatched with cadjan leaves and straw. It is the northern half of what was formerly used as the Civil Dispensary. At the commencement of the epidemic the building was somewhat dilapidated, having been allowed to fall into disrepair as there was some doubt whether it would be required when all the wards of the recently-enlarged hospital became available. But the outbreak of Cholera soon settled this point, and the building was speedily put into thorough repair, and its floor was asphalted. It is very lofty and airy; the very materials of which its walls are constructed, with well-arranged doors and windows, provide for perfect ventilation. It is divided into four wards, each about 30 × 18 feet, so as to allow of segregation of the sexes and races. It may appear strange that one speaks of segregation of the races when so catholic a disease as cholera is alluded to, but it is a fact, nevertheless, that native patients would not resort to hospital unless they knew that they would be treated in wards specially devoted to their race. Notwithstanding the shed-like appearance of the building, experience has proved that it is admirably adapted for a hospital. Its adaptation to the accommodation of cholera patients is shown by the fact that during the epidemic there has not been a single instance of spreading of the disease to any of the friends of, or attendants upon, the sufferers; and, in the case of children, their mothers or other near relatives have been allowed to remain with them night and day. Fortunately the number of patients present in the wards at any one time during the continuance of the epidemic has never been such as to lead to any over-crowding.

Perhaps it is partly to this circumstance and to the good ventilation of the wards that a greater mortality was not experienced.

Disinfectants.—Whether fresh cholera discharges are, or are not, infectious, there is a propriety in cautiously dealing with them. The following are the regulations in force at the General Hospital :—

Every patient on admission is placed on a taped cot, the tape being so arranged as to afford a convenient aperture for the passage of the dejections. Clean vessels are supplied for the reception of the discharges (from both stomach and bowels) first passed after coming to Hospital. When the nature of the evacuations has been ascertained by inspection by a competent person, the vessels used during the remainder of the illness are dusted freely with McDougall's powder (a mixture of carbolate and sulphate of lime with some free lime). Immediately after inspection the discharges are buried, thrown into a hole and covered with a layer of fresh earth. McDougall's powder is freely sprinkled under the cots and on the tape and bed-clothes with which the patients are supplied. Thus the atmosphere of the wards is strongly impregnated with the peculiar odour of the disinfecting powder ; and I am of opinion that this has a decidedly beneficial effect upon the patients, and, as before remarked, it may be that it had some effect in preventing the spread of the disease to the friends of, and attendants upon, the sick.

The clothes which patients bring with them to Hospital are taken from them, steeped in a tub of water through which a quantity of McDougall's powder has been diffused, and then well washed and stowed in a separate chamber until required. There is one disadvantage in this use of the disinfecting powder, viz., the quantity of lime it contains is destructive of the materials soaked in the mixture ; the fibre, whether woollen or cotton, becoming so rotted that the cloths easily tear. As soon as pure carbolic acid is obtained at the General Hospital in sufficient quantity, I shall experiment to ascertain whether it has not all the disinfecting, without any of the destructive, properties which McDougall's powder possesses.

In bringing this report to a close, I beg to mention that I am aware that the impressions and opinions expressed are based quite as much on experience previously gained as on

that of the late epidemic, upon the observation of which the report professes to be founded. But I have really endeavoured to confine myself to actual occurrences and to avoid speculations of any kind whatever.

It is a matter of great regret that notwithstanding the vast amount of actual knowledge of cholera which has been attained, there is, nevertheless, so little definitively known of its pathology, and that as regards the *methodus medendi* one is almost forced to acknowledge the truth of Dr. Belcher's* remark that "although some cases recover, Pestilential Cholera is not amenable to treatment."

I should fail in my duty if I did not here acknowledge the indebtedness of my patients and myself to the fearless and conscientious manner in which the Medical Subordinates, the Medical Students in charge of the cases, the ward-coolies, and the extra attendants engaged to minister to the wants of the sufferers, carried out the instructions given to them. My anxiety about the patients was greatly relieved by the confidence I had that during my absence from Hospital, they would be kindly, skilfully, and carefully tended.

APPENDIX I.

Predisposition to attacks of Cholera.

I have alluded to the age and constitutional condition of my patients, because in my late readings I have met with two opposite opinions upon this point. Sir Ranald Martin† says, "Although it be quite true that the cholera poison requires no definite predisposing conditions in the system to enable it to produce its effects, and that it *proves fatal at all ages*, and nearly equally so to both sexes, and that neither the weakness of infancy, the vigour of manhood, nor the decrepitude of old age, are a safeguard against its inroads;—still, in common with fever and dysentery, it may be truly said that *whatever depresses the constitutional powers* will predispose to the invasion of cholera, as the use of crude, indigestible or ill-prepared food,—fatigue, want, filth and misery,—but above all, intemperance in the use of spirituous liquors, so common to the lower orders of English in all parts of the world."

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* *The Lancet*, September 1st, 1866, page 232.

† The Influence of Tropical Climates on European Constitutions, Edition 1856, page 300.

Mr. Wilkins, on the other hand, tells us in his paper "On the Etiology of Cholera"* that :—

"Vigour of body predisposes to cholera. This is a fact which nobody having any experience of the disease will deny. We have statistical proofs also that this is the case. Dr. Balfour, (now Inspector General of Hospitals of the Hyderabad Subsidiary Force) in his statistics of cholera, remarks :—'One race of men is more susceptible to the influence of the cholera agent than another. The European Soldiers, for instance, are much more frequently attacked with it than their native comrades, and the Madras Native Troops have lost more of their strength than the native soldiers either of Bengal or Bombay.'

"The General Board of Health in their report of the epidemic cholera of 1848-49, state—'A very large proportion of its victims were in the prime of life. Out of 2,322 attacks and 1,058 deaths occurring at Glasgow in which the ages were carefully taken, the numbers attacked between 20 and 40 (1,148) were more than double those up to 20; between 20 and 50 the numbers more than doubled those who suffered in all the other periods of life put together.'

* * * *

"Dr. Balfour remarks also,—'That the older soldiers have been less frequently attacked than the younger men.' This immunity enjoyed by those advanced in age who are, it will be admitted, generally wanting in vigour, is observed among all classes of people. It is seldom, comparatively speaking, that we hear of an old man or woman being attacked with the disease."

Now, I must at once say that I am entirely with Sir Ranald Martin, and this not merely from the puny tables presented in the foregoing report but from what I have observed of the disease since 1848.

I conceive that there are under-currents of error in Mr. Wilkins's application of the statistics he brings forward.

1. Mr. Balfour's statistics referred to are those of soldiers only; and although one would not for a moment dispute

* Madras Quarterly Journal of Medical Science, No. XX. October 1866, page 325.

their correctness as to European troops suffering more severely from cholera than their native comrades, yet one may fairly ask whether, taking all circumstances into consideration, this may not, to some extent, be accounted for. Cholera outbreaks, for the most part, occur upon the line of march. European Soldiers in cantonments have airy barracks, and sleep on cots, their meals are regular, and they are little subject to fatigue. On the march, they occupy somewhat crowded tents, sleep on the ground, their meal-hours are less regular, they are often fatigued, and they are incautious of exposure, &c. Whilst Native Troops on the march have their habits and mode of life comparatively but little changed.

2. The statistics being those of soldiers only, do not give us any information as to how the general civil populations fare in the districts through which the troops are passing,—how many villages are stripped of their inhabitants,—nor how many of the camp-followers,—children, men and women, able-bodied or infirm,—are entombed at the different halting stations. I presume that, with few exceptions, medical men who have marched with Regiments, either European or Native, which have been stricken with cholera, will acknowledge that the number of unrecorded cases among the camp-followers which they have been called upon to administer to, has exceeded the number of recorded cases among the troops.

3. As to the Glasgow statistics. That city has a most unenviable notoriety for containing a larger number of dram-drinkers to excess, than any similar-sized city in the whole of Her Majesty's dominions. And it may be safely concluded that a larger proportion of these whiskey-tipplers will be met with between the ages of 20 and 50 than at any other time of life. And I believe with Sir R. Martin that habitual intemperance does give a predisposition to suffer from cholera.

Again, these statistics are defective, in as much as there is no comparison drawn between the numbers attacked and the numbers living at the different periods of life.

4. "The older soldiers have been less frequently attacked than the younger men." On a reference to the Army Statistical Reports, I find that, in India, the relative mortality (from all causes) to strength is generally higher among

soldiers of over 40 years of age than among those below this age. The returns, however, only give the strength and mortality at the different ages, and not the number of admissions into hospital, so that there are no data by which to judge of the relative liability to sickness. In the foregoing report I have alluded to the fact that the experience of both Dr. vanSomeren and myself during the late epidemic is opposed to the view that cholera has a special proclivity to avoid young children and elderly persons, and to seize only on adolescents and adults in the prime of life and in full vigour of constitution. Although I have no statistics to support the opinion, I really think that some explanation may be afforded of the statement that "the older soldiers have been less frequently attacked than the younger men." There is a well known law of endemic diseases—especially of those due to malaria—namely, they have a tendency to attack new comers and strangers with great severity, whilst permanent residents, though their health may be seriously damaged by the endemic influence, have a comparative immunity from attacks of specific disease. I believe that the same is the case with cholera. During the late outbreak, out of 71 native patients 22 were strangers to Madras, persons recently arrived from various towns and villages at a distance, and they were attacked immediately on coming under the epidemic influence. Besides the 22 natives there were other instances of strangers being attacked; one European had but recently arrived from up-country; one Eurasian lad, entered as from New Town, had arrived from Bangalore the day before he was attacked; two members of a Eurasian family from Poonamallee, entered as from Black Town, had only been in Madras a few hours before being seized with the disease, having come down to see a relative off by a steamer. It is well known to almost all the medical practitioners in this city that a great many persons newly arrived at Madras, some from Mofussil stations, some from England, were attacked with cholera during the late epidemic. I have repeatedly mentioned instances of this kind to my colleague, Dr. Paul, and his recognition of the fact has been shown by his questioning reply, " Is it not strange how the dire influence tells upon new-comers ?" And thus it may happen that the general result " the older soldiers have been less frequently attacked than the younger men," is due to the circumstance that many of these younger men are quite recent arrivals in the

country, and therefore have a greater proclivity to suffer from the disease than their better-seasoned comrades. This must not be taken as an argument in favour of the "vigour of constitution" theory, because it by no means follows that young soldiers have greater vigour of constitution than the older men, for loss of vigour results in invaliding, and it is seldom that we see really old men in the ranks of a European Regiment. Besides I have before shown that the vigour of constitution theory is decidedly "not proven."

I have recently met with some interesting remarks on cholera, by Dr. Belcher,* Physician to the St. George's-in-the-East Cholera Hospital. This gentleman has attended over 300 cases, and he follows Dr. Copland's division into four varieties, namely, Cholera biliosa, C. flatulenta, C. spasmodica and C. morbus. I acknowledge the propriety of this division, but the first two varieties find no place in my tables; when met with at the Madras General Hospital they are returned as Diarrhœa Choleraica. I quote the following from an epitome of Dr. Belcher's remarks:—

"The persons attacked with cholera biliosa were generally of the middle age and robust. The greater number had led irregular lives, were of intemperate habits, or intoxicated when attacked. . . . Cholera flatulenta occurred chiefly among the aged, debilitated and ill-fed. . . Cholera spasmodica occurred chiefly among young adults and the middle aged—comparatively rarely among the aged. . . . . Cholera morbus, Asiatica or pestilential cholera represented the type of a large number of cases. This variety occurred chiefly among the aged, though it spared neither age nor sex. At least two-thirds of all the cases of cholera under Dr. Belcher's care were females and Irish. When this variety occurred among others than the aged, it was the half-starved, dirty, ill-fed, squalid children of poverty who were as a rule the victims. They lived in dens of filth and wretchedness, the stench of which was stifling. The majority, indeed nearly all, of those attacked by this variety died. The mortality was greatest in that part of the parish polluted by bone-houses and soap-boiling premises, and by a

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* *The Lancet*, September 1st, 1866, page 232.

dust-yard, the effluvium from which is proverbial, for there all kinds of vegetable matter and filth from various parts of London are deposited to rot and contaminate the atmosphere. Dr. Belcher is of opinion that the true Asiatic cholera does not admit of cure. In his experience, every kind of treatment that has been advocated and vaunted has proved to be a failure. No reliance, he says, can be placed on any specific mode of treatment in this variety, more especially in the severe form. The main thing is good nursing. . . . The first three forms of cholera Dr. Belcher thinks may be looked upon as amenable to treatment, but not infectious; but the Asiatic variety, he believes, is undoubtedly infectious, and not amenable to treatment, though some few may recover."

Since the foregoing report was written I have received the first volume of *A System of Medicine, edited by Dr. Russell Reynolds*, and I quote the following remarks from an exhaustive article on Epidemic Cholera, by Dr. Goodeve.

"*Influence of Age.*—Mr. Grainger states that the liability to fatal attacks increases after the age of fifty in both sexes; the ages from five to forty-five having the lowest comparative mortality. In India in 1861 the influence of age was hardly perceptible. According to Dr. Gull, in England it was most fatal to those under one year and over fifty-five, corresponding indeed, with the general tendency to mortality in England.

" *Residence in India.*—It has been thought Europeans of short residence in India were more liable to suffer than those of long residence, but the opinion does not seem to have been formed upon any well-ascertained facts. The Committee for the epidemic of 1861 investigated the matter for that outbreak, but they consider their data too imperfect for forming opinions. They say ' We can base no conclusions upon the figures shown in this table. The soldiers whose period of service was shortest apparently suffered the most. The proportion of deaths to strength falls from 7·7 per cent. among men of less than two years Indian service to 3·5 per cent. among men who have served more than ten years. . . . The proper investigation of this subject must be left to future observers.' It will probably be found that the influence exercised by length of residence in India upon the liability to Cholera is as little important as that of the other

predisposing causes that have been already noticed." Page 135.

I think it only fair to give this extract here in order that it may be contrasted with what I have said on a previous page, written before I read Dr. Goodeve's article. The opinion expressed in the last sentence of the extract is quite opposed to that which I entertain, and have mentioned, as to the influence of a short residence upon liability to cholera. And it appears to me opposed to the only fact actually ascertained by the Cholera Commission of 1861 on this subject, namely, that " the proportion of deaths to strength falls from 7·7 per cent. among men of less than two years Indian service to 3·5 per cent. among men who have served more than ten years." In order to appreciate the full force of the above per-centages, it is necessary to contrast them with those from all diseases in the army. I have therefore again referred to the *Army Statistical Reports*, and in the volume for 1863, pages 153 and 159, I find the following tables:—

" *On the Influence of Age on the Mortality.*

	Under 20 years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Bengal.	1,339	13	16,491	305	15,212	468	5,642	190	2,301	100	466	25
Madras.	599	2	3,958	59	4,871	118	1,853	52	878	27	188	14
Bombay......	387	1	4,128	33	4,863	68	2,228	54	1,063	29	250	11
Total..	2,325	16	24,577	397	24,946	654	9,723	296	4,242	156	907	50
Ratio of Deaths per 1,000 of Strength..	6·88		16·15		26·22		30·44		36·77		55·13	
Do. Bengal 1862, Madras & Bombay 1861-2.	4·28		18·67		23·67		33·84		39·82		46·43	

"The results correspond closely with the average of the preceding period, and illustrate the influence of tropical climates upon the constitution, the mortality increasing with age in a much more rapid ratio than in temperate regions."

"*On the Influence of Length of Service on Mortality in the Army.*

"*Ratio of Deaths per* 1,000 *of Strength.*

Length of Service.	1 United Kingdom.	2 Mediterranean and British America.	3 West Indies, St. Helena, Cape, and Mauritius.	4 Australasia.	5 Ceylon, China, Madras, and Bombay.	6 Total.
Under 5 years....	4·60	4·21	5·90	18·00	13·45	6·44
5 to 10 „ ...	8·71	9·61	15·36	18·08	23·89	13·46
10 to 15 „ ...	12·50	7·63	12·35	24·21	21·00	14·25
15 to 20 „ ...	19·75	25·95	19·23	29·80	40·84	25·20
20 and upwards.	14·81	28·20	52·63	30·77	30·30	19·63
Total.....	8·13	7·57	10·11	20·15	21·04	11·08

"The ratio of deaths is much below that given in the general summary, as the regiments serving in Bengal are unavoidably omitted from this table."

The first of these two tables I have reproduced here to afford proof of the statement I made that, in India the mortality among soldiers of upwards of 40 years of age is greater than that of those below this age. And although the Bengal returns are omitted from the second table, it will serve the purpose for which I have introduced it, namely, to contrast the general mortality according to length of service with what is known as to the special mortality from cholera, according to length of service. I take the ratios given in column 5 and reduce them to per-centages. Then accepting the mortality under 5 years of service as representing that under 2 years of service, we have the following results :—

British Army in India.	Under 2 years of Service	Above 10 years of Service.
General mortality per cent.	1·345	2·962*
Mortality, per cent. from Cholera, as per Commission of 1861.	7·700	3·500.

Unless service in India under 2 years, or, what is equivalent to this, recent arrival in the country, does predispose to attacks of cholera, I am quite unable to arrive at any explanation of the above discrepance in mortality.

* This is the accurate per-centage and is thus found ; as Strength above 10 years (5266) : 100 : : Mortality above 10 years (156) to 2·962.

APPENDIX II.

The Mode of Propagation of Cholera.

Again I quote from Dr. Goodeve's article :—

" *Diffusion of Cholera.*—Although it is probable that cholera is spread by human intercourse, it is indisputable that it originates in places without it being possible to trace any previous communication with infected persons. This has happened over and over again in towns and large establishments in which the outbreaks, after the greatest perseverance, could not be accounted for by any previous exposure to infection. Its appearance at St. Kilda, in the Western Islands of Scotland, is as strong an instance as can be given. This Island was cut off from all communication with the mainland, and yet the disease appeared in it suddenly without a trace of importation. In 1848 Dr. Parkes could not trace any contagious origin for the first cases occurring in London.

" *Contagion of Cholera.*—The fact of the diffusion of Cholera by human intercourse leads us to inquire how this operates, and to the question of the contagion of Cholera. Diffusion by contagion does not negative the possibility of an origin independent of infection. The majority of medical men in India, accustomed to see Cholera year after year, to be in constant intercourse with the Cholera sick, and to see the general immunity of hospital attendants and of themselves, doubt the contagiousness. Some physcians, however, think differently. It does not seem proved that contagion can exist in the shape of a volatile poison emanating from the sick, and rapidly infecting the healthy. It would not be so easy to disprove that there may not be some form of poison which may not be volatile, or which may require time to become so, or to develop its poisonous properties and capability of infection. . . . I should, as far as my own experience goes, say that Cholera does not spread from the sick to the healthy by any rapidly acting emanation. Dr. Morehead's observations support the view of the non-spreading of Cholera in Hospitals through contagion." Page 141.

And further on, treating of the *Portability of the Cholera Poison,* Dr. Goodeve makes the following remarks, which I extract piece-meal from his text:—

"We have no knowledge of the period of the disease at which contagious emanations from the sick, if there are such miasms, are evolved. Those who believe that the poison is to be found in the evacuations would consider it to be given off with the rice-water stools. . . . The regularity with which, over wide areas, Cholera epidemics advance, and the simultaneousness with which they attain their maxima and their decline, seem to imply some general law, and not a diffusion dependent upon the chances of fæcal contamination only. I think that those who have been in the habit of seeing much of Cholera will not be inclined to think that there is much potency, at all events, in the *fresh* Cholera discharges. . . . It may be that decomposing Cholera discharges may be more mischievous, as has been supposed by Pettenhofer. If, as supposed by Dr. Budd (of Clifton), the poison is multiplied so rapidly in epidemics as to suffice for the rapid diffusion which takes place in severe epidemics, it ought to be equally powerful when under observation in a sick ward. The mode in which Cholera spreads in wet weather in India, seems adverse to its diffusion by the discharges. . . . Although the specific poison of Cholera may not exist in the rice-water stools, it must be admitted that Dr. W. Budd has brought forward strong evidence in support of his views, and the facts which he adduces can, in the present state of our knowledge, be explained only upon the supposition that the evacuations of Cholera patients have, in some state or other, an influence upon the spread of Cholera. There are yet many points that require elucidation to prove that the Cholera poison multiplies in the human body, though perfectly in accordance with the cases of many other epidemic diseases, or that the specific agent is contained *pur et simple* in the rice-water stools. It would seem that they are the congenial soil for the multiplication of the poison, rather than the direct source. It would be a good thing for mankind that Dr. Budd's views should prove correct. It would then be a comparatively easy thing to prevent the spread of the dire pestilence."

It is gratifying to me to find that the conclusions as to the Contagiousness of Cholera, which I have deemed legitimate, from my comparatively limited observation, should accord so closely with those which Dr. Goodeve has arrived at from his more extended personal observation and from the examination of a much larger mass of Cholera literature than I have had the opportunity of perusing.

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APPENDIX III.

The Influence of Heat.

Remembering that I had read some observations of Sydenham, strongly advocating the application of external heat in exhausting diseases, I referred to Dr. Greenhill's Edition* of his works, but could only find a general reference to the subject under the head :—

"*Adolescentulorum juxta cubantium calor his præ caeteris omnibus prodest. Cujus ratio redditur.*"

But whilst turning over the pages of Copland's Dictionary, article *Pestilence, Choleric*, I found what I wanted, and I trust that its quaintness will be an excuse for my giving the extract entire.

"*De Methodo Medendi Morbos per Accubitum Junioris. Cap.* 16. May ye 19th, 1662, I was called in ye night to Mrs. Change, whom I found very ill of a Cholera Morbus ; she had many ugly Symptoms, as coldness of the Extreme parts, talking a little idly, intollerable Sickness, & felt a tingling in her Fingers & flesh outwardly. I judge it dangerous to use Dilutients especially by Clysters in a Women (*sic*) soe green (she having not lain in a Month) & ye Disease pressing soe hard upon my heels : Soe I ordered her to take a warm Cordial, & that a good draught of it, & her Husband to lie close to her Back naked, & her sonn of 12 years close to her Belly, & to lay on more cloths & to warm her Leggs & Hands wth hot cloths : She immediately fell into a moderate Breathing and all Sympt. ceased ; & after enjoyning her to keep her bed ye next day, & to eat & drink nothing save a small Quantity of Barlybroth a day for 2 days she perfectly recoverd.

"February 1661 I was called to Mrs. Hulston, who after a very Chronical fever was fall'n into a very fatallike Diarrhea ; I saw it was to noe purpose to give astringents seeing ye Disease proceeded from a Decay of natural heat, therefore I took this Course, viz., I caused her Sonn a plump hot Lad of 13 years of age, & her Nurses sonn of 6 or 7 years to goe to bed to her naked, & to lie ye one

* Editio altera. Sydenham Society, 1846, page 55.

close to her Belly, ye other close to her Back, wch they did, & as long as they continued with her she had noe stools ; but ye Boys rising at any time ye Looseness would immediately return. I commanded that she should persist in ye Course till her cure should be compleat, (the Boys relieving one another by turns in ye day time) & soe she fully recoverd not only of her Looseness but allso of her Sickness in general.

"The very same course I took with one Mr. Little, who had a fever abt 7 weeks, & at yt time Aug. 1662, soe far spent yt his Drs judged him a Dead-man : He was ancient & having been much purged wth violent Medicaments he was as weak as ever I saw any yt recoverd ; I (having to noe purpose made attempts to lay his fever by inward Medicines & to raise his strength by Cordials) told his wife that nothing could preserve his life but ye putting a Boy to bed to him; soe she procured a Link boy to lie very close to him all night, & ye next morning I found his fever allmost off, & his eye & countenance more lively, upon wch I pronounced all danger to be over, yett afterwards upon my giving him a Clyster & upon ye recess of ye Boy he began to relapse ; but ye Boy being gott again & I giving noe more Clysters he perfectly recoverd.

"The very same way had I cured before Bp. Monk's Lady, who was an aged Woman of a very feeble & thin habit of Body, & had an Ague wch (tho gone) had soe weakend her yt her Physician Dr. Ridgley looked upon her as dead; when I was sent for she had allso spitten some purulent matter & blood which they shewed me (in abundance) upon ye Napkin. I told ye Dr. yt I apprehended yt nothing could save her life, but a speedy transplantation of some young Spirits upon her, to wch he readily agreed, & a Girl of 13 years was put in close to her Breast, upon this she recoverd very speedily both of her Unspiritedness & her Coughing : But ye Girl fell sick, wch was attributed to her lying wth ye Lady, tho I was confident to ye Contrary, having never known any Mischief yt way ; however she had first coming out upon her Petechiæ, and afterwards large Ulcers upon her Breech ; But Dr. Ridgley and I recoverd her."

ART. IX.—*An Examination of Some of the Principal Points in Cholera Hypotheses.* By JOHN C. DOUGLAS, Esq., Certificated, Experimental Physics and Animal Physiology, Government Department, Science and Art; National Medallist, Experimental Physics, 1861; Assistant Superintendent E. I. Government Telegraph Department.

ALTHOUGH papers innumerable have been written by those who have had the best opportunities for observation, and notwithstanding the enormous number of facts collected on the subject of epidemics in general, and those of Cholera in particular, it is a fact to be deplored that, up to this time, there is little if any unanimity of opinion as to the cause or the mode of treatment of this terrible scourge; and although it is admitted on the one hand that management may do something towards assisting nature to effect a cure, it is also denied that there is sufficient reason for assuming those treated medicinally stand a better chance of recovery than those in which the disease is left to take its course uninterfered with by medical skill.

In Medicine there are undoubtedly more useless and prejudicial hypotheses advanced than in any other science; this may be partly due to the enormous number practising medicine, compared with those studying other sciences; but I am inclined to the opinion that most of those unfounded hypotheses, emanating from men whose knowledge is beyond all doubt, result rather from a defect of the system of medical education, than from any shortcoming in the intellectual calibre of the propounders.

Statements are put forth as proved by the experience of a single practitioner in a few cases, which statements, from their very nature, could only be established as true by the united experience of hundreds of practitioners, and in the proof of which many thousands of cases would be necessary to eliminate the disturbing causes.

The requirements of a sound medical education are not summed up in the two items—a trained power of observation

and a memory to retain a knowledge of the proper application of remedies, although these qualifications appear to be almost *the only ones* insisted on by examiners, and (in many cases) possessed by practitioners. These qualities are certainly sufficient in the majority of cases in which their possessor only desires to apply the facts discovered by others; but should he wish to add to the store of knowledge already possessed by mankind, in addition to applying this store to the relief of suffering humanity, then there can be no difference of opinion as to the necessity for a careful exercise of the reasoning powers being made to form a portion of the training necessary to complete the professional education of the future medical man.

I have no doubt that I shall by some be considered as having made rash charges in thus pointing out what I believe to exist as a defect in Medical Professional Education. But I appeal to the numberless, useless theories in circulation; the manner in which remedies are brought forward as infallible, to be rejected almost immediately as worthless; to the differences of opinion amongst the profession generally upon matters admitting of direct proof by an appeal to observation; finally I appeal to the Calendar of the Madras University, to find that no mention whatever is made of the necessity for a knowledge of logic in the candidate for a degree in medicine. It may be urged that the treatment of disease, which the student observes as a student, involves continuous application of the Laws of Inference, and that, if the University does not insist upon logic as logic, it insists upon other subjects, which by the training they afford the logical faculty, well perform the function of a knowledge of logic proper. But to these objections, I would reply, the student would be benefited by a knowledge of the laws which govern his inferences; that this knowledge would save him from numerous errors if given him during his student-ship, instead of letting him know that while others obey its dictates, he can exercise his faculties when he has life or limb depending upon the correctness of his inferences; and I cannot see an exercise adequate to the exigencies of the case, in all the inferences being, as they are generally, drawn for the student by the Professor; yet this is the only way possible to convey the strictly medical knowledge required to be conveyed.

"But, by knowledge is understood the mere possession of

truths;" while, "by intellectual cultivation or intellectual "development, the power acquired through exercise by the "higher faculties of a more varied, vigorous and protracted "energy." *(Hamilton's Metaphysics, vol. 1, page 8.)* Is this "Intellectual Development" cultivated in a medical student by his teacher drawing inferences for him, or in other words by teaching him the bare facts of medical science? To the second objection, I would reply, I find that to obtain a degree in Medicine, in the Madras University, the candidate is required, in addition to his strictly medical examinations, to pass the Matriculation Examination, and to translate an exercise from the first four Books of "Celsus de Medicina." On examining the Matriculation Examination papers, I find the Arithmetical and Algebraical papers are worthless for the grand purpose of Mathematical training, as in no one question in either of these papers is any demonstration required, or pointed out as desirable. In Euclid, the examination is as it should be, in an entrance examination, easy, and in the Languages a good memory and a good grinder would certainly render the elementary knowledge of them required, ill-fitted to supply the means of mental culture to medical students.

I am of opinion that it would be highly conducive to the increase of knowledge, if every scientific teacher introduced or concluded his elementary courses by a discourse on the method of the particular science it is his profession to teach; and by leading his pupils to a correct estimation of the values of the hypotheses employed. The latter (I am sorry to have to so record my experience) is too often neglected, and hence the prevalence of an unduly high valuation of hypotheses, which are too often regarded as true, while they are in reality illegitimate; and an injurious multiplication of, and adherence to, hypotheses, which, instead of being regarded as instruments for use in the attainment of knowledge, are too often regarded as knowledge itself.

That I am the first to point out this failing in our educational system, I do not pretend; it has been pointed out over and over again, but is far from having been generally recognized. This teaching of the Medical Sciences merely empirically or experientially does not apply to all; and Professor Huxley and Dr. Carpenter are notable instances of philosophical teachers, concerning the necessity of a knowledge of the laws of inference. J. S. Mill *(Logic, vol. 1,*

$. 6, *page* 10*)* says, "Mankind judged of evidence, and "often correctly, before logic was a science, or they never "could have made it one. And they executed great "mechanical works before they understood the laws of "mechanics. But there are limits both to what mechanicians "can do without principles of mechanics, and to what "thinkers can do without principles of logic. A few indivi-"duals may, by extraordinary genius, anticipate the results "of science; but the bulk of mankind require either to "understand the theory of what they are doing, or to have "rules laid down for them by those who have understood "the theory." Is the latter condition fulfilled in the ordinary education of the medical student? And the following extract from the same section seems to me generally applicable to medical science. "And if several of the more "difficult sciences are still in so defective a state; if not "only so little is proved, but disputation has not termi-"nated even about the little which seemed to be so; the "reason perhaps is, that men's logical notions have not yet "acquired the degree of extension, or of accuracy, requisite "for the estimation of the evidence proper to those particular "departments of knowledge." The disputes in medicine proper are legion. A spirit of disputation seems to have usurped the place of calm and patient investigation; and may not the cause of this be found in the fact, that the kind of evidence peculiar to this science is exceedingly difficult to estimate, and logical science forms no portion of the medical education. It seems indeed to have been forgotten, or overlooked in educating for the medical profession, that "intellectual cultivation and knowledge are not the same" and "stand in no necessary proportion to each other." *(Hamilton's Metaphysics, vol.* 1, *page* 8.*)* It is my humble opinion that the cause to which at least some of the confusion in medicine is due is defective professional education, and my belief that if a more perfect system of mental culture were substituted for the present system of simply communicating facts to the future medical man, many of the present useless discussions would give place to unanimity of opinion, and an earnest spirit of enquiry would take the place of the too common error of rash assumption. Having stated what I believe to be causes retarding the advancement of medical science, I shall briefly examine the more prominent points in a set of hypotheses invented to account for Cholera Epidemics, and leave the reader to form

an opinion for himself concerning the justness of my strictures in the particular instances examined.

It will be necessary to commence by adopting some standard or rules with which to compare the hypothesis to be considered; Sir W. Hamilton *(Lectures on Metaphysics vol. 1, page 171)* says, "The necessity for some hypothesis "being conceded, how are we to discriminate between a "good and a bad, a probable and improbable, hypothesis? "The comparative excellence of an hypothesis requires in "the first place that it involves nothing contradictory, "either internally or externally; that is, either between "the parts of which it is composed, or between these and "any established truths. In the second place an hypothesis is probable in proportion as the phenomena in question "can be by it more completely explained. In the third "place an hypothesis is probable as it is independent of "subsidiary hypotheses." Guided by these three rules, I will examine the three principal classes of hypotheses invented to assign a cause to cholera; the classes to which I allude may, according to the nature of the cause they assign, be named respectively the Electrical, Poison, and Miasmatic classes of hypotheses, and I shall deal with them in the order in which they are here enumerated.

I greatly regret that I have not been able to obtain such extensive information as I could wish, and I do not therefore present this as an exhaustive examination, but rather as a cursory sketch, in which a few of the most important points of the subject are dealt with.

The Electrical hypotheses may be divided into two classes, the direct and the indirect; the former class ascribing the effect (cholera) to the direct action of electricity on the organism; the latter to an indirect action, as, the effect of a change in the chemical properties of the atmosphere caused by electricity. In addition to these distinct classes, there are innumerable observations and surmises put forward by different persons as showing a dependence of epidemics on electrical disturbances, but without any pretensions to ascribing a mode of action direct or indirect. To examine every hypothesis advanced is far from being my wish, even if I were equal to such a task; I shall therefore take a few instances as characteristic of the whole.

In a book entitled "Electricity, its Nature, Operation and Importance in the Phenomena of the Universe," by William

Leithead, Secretary to the London Electrical Society, the author, after explaining the elementary phenomena of electrical science in the first part of the work, makes an attempt to prove nervous energy is the direct action of electricity, and the nerves are simply electrical conductors; and to erect upon this basis a vast superstructure of assumption.

In a review of this work in the "Annals of Electricity," vol. ii., page 76, it is justly pointed out by the reviewer that the author has mistaken "*acknowledged assertions*" for "*acknowledged facts*," and that "some excellent reasoning "is founded upon no other basis than the latter class of "data." The author explains a depression felt on gloomy days, by the electroscope invariably indicating on such days a negatively electrified state of the atmosphere; this the reviewer (a man of the most extended experience) points out is an *assertion*, as the electroscope indicates no such thing. Mr. Leithead,—after stating that electricity is invariably set free during chemical action, and that consequently it must be set free during the varied chemical action always in progress in the human body,—comes to the conclusion that this electricity must be conducted quietly from the body by some path, and that it aids in the development of heat "by its being transmitted "from the nerves, the most perfect conductors in the body, to "other parts of the frame, and finally to the surface through "less perfect conductors." Admitting the fact of the development of electricity within the body, it by no means follows that any must be conducted quietly from the body, it is probably almost entirely neutralized in the body, being in the form of currents. And far from the nerves being the best conductors in the body, I find on reference they are worse conductors than the muscles in which they are imbedded, and hence if the electricity did escape from them, it would absorb instead of developing heat as stated. De la Rive (*Traite de l' Electricité, t.* iii. *page* 41) says, "Sous le rapport de la conductibilité la substance nerveuse est très inferieure au tissu musculaire." Why should not the chemical action produce the heat directly without the intervention of electricity?

Again, because the spinal column is divided into two distinct cords, therefore says Mr. Leithead, "it is highly "probable that there is an ascending current along one "portion of the cord to the brain, affecting the organs

"of sensation, and a descending current through the "other half, influencing the organs of motion; or, perhaps, "there is a negative and positive portion of the cord, the for-"mer constituting the agent of sensation, the latter that of "motion." Because there are two cords, and two kinds of electricity, does it follow the cords convey electricity? No experiment has as yet shown the existence of such electricity. The columns of the cord are not insulated from each other for electricity; and it has been satisfactorily demonstrated that the nervous and muscular currents move between the transverse and longitudinal sections of the nerve or muscle. Mr. Leithead, with reference to a cholera epidemic, says, "During the whole of the period of the prevalence of "the malignant cholera at Liverpool in the fall of the year "1832, a certain magnetic needle indicated a constant nega-"tive state of the air." To this the reviewer above mentioned replies, that having seen the instrument referred to, he is "perfectly convinced that neither the motions nor posi-"tions of its needle are indicative of the electrical state of "the atmosphere," and there cannot be a doubt as to the reviewer being correct.

From the above alone it will be at once apparent that Mr. Leithead's hypothesis is valueless, being contradictory internally and externally and dependent upon equally inadmissible subsidiary hypotheses.

Mr. Weekes, a surgeon and an eminent experimentalist in Electrical science, has given tables of the electrical state of the air, the state of the weather, and the diseases prevalent at the time of the observations; but, although he draws conclusions from these tables, I cannot find by examination of them any grounds for his conclusions. To take an instance:—a table published in the Annals of Electricity, page 119, volume viii., gives Mr. Weekes' observations for August 1841, and is a register of sixty-three observations. The electrical state of the atmosphere registered is, in thirty-seven of these instances, positive, in twenty neutral, in five negative, and in one variable. On the second occurs two entries, one positive, the other neutral; opposite the neutral entry occurs the following:—"Many cases of catarrh, and some with "symptoms of influenza. Pertussis continues prevalent." On the third occurs three entries, two neutral, and one positive; opposite one of the neutral entries is entered, "Sensation of extreme languor and oppression very general.

"Odontalgic affections are rather prevalent." On the eleventh occurs three entries, two neutral and one positive; opposite one of the neutral is entered, "Obstinate diarrhœa is somewhat prevalent." On the twenty-seventh occur two entries, one positive, and one neutral; opposite the neutral is entered, "General sensation of sultry oppressive heat, extreme lassitude, headache, and slight nausea. No trace of free electricity can be detected." These are all the entries in this month's register relating to the prevalence of disease. The weather at the times of the registration of the neutral electrical state of the atmosphere was in ten instances rainy, in nine cloudy, and in one clear. The thermometer varied between 58° and 75°, and the barometer between 29·12 and 29·82. Mr. Weekes comments on this month's register as follows: "The general state of the atmosphere during the month of "August would appear to have exercised a highly salubrious influence over the animal system; whence has resulted "a freedom from disease beyond the average standard, not "only in this district, but throughout the eastern parts of "England. The only remarkable departure from the above "condition in my immediate vicinity was incident to about "ten days after the 14th instant, when I noticed the frequent recurrence of somewhat obstinate aphthous affections "with swelling of the parotid and submaxillary glands in "young persons, especially in females."

I am far from asserting that this register kept by Mr. Weekes is a useless record. If many such records were kept for different places, and extending over a considerable period of time; if the particulars upon which the assertions of the prevalence of certain diseases is based were given; and if the most improved instruments and formulæ were made use of; such registers would be of the greatest use in demonstrating any connection which may exist between atmospheric conditions and different states of the human organism. But even admitting that in this case every entry made is based upon reliable evidence, and that the diseases mentioned were really prevalent as stated, the register can only become useful when it fulfils the above condition as to time, and is compared with similar records kept for other places, for people with different habits and constitutions, inhabiting countries with different physical features, and, in short, under conditions as varied as attainable. For without these conditions as to time and place, neither chance, nor other disturbing causes

can be eliminated. If we examine how far these conditions have been fulfilled in the case of Mr. Weekes' register, we shall find they have apparently been overlooked. The first Register published in the Annals of Electricity is dated May 1841, and the portion quoted above is that for August of the same year, and yet the conclusion is boldly drawn, "that the state "of the atmosphere" "would appear to have exercised a high-"ly salubrious influence over the animal system," and this is drawn in the face of the registered statements as to prevalence of certain diseases, which are rather numerous, considering the register is only for one month. But during the month of August, according to the register, the weather was most variable, the barometer and thermometer varied irregularly, and there appears to have been rainy, cloudy, and fine days with great irregularity—in fact, every element considered appears as varied as could be well imagined, and yet the above conclusion is drawn. Again, to say certain diseases are prevalent, is a statement which to be useful scientifically, requires that the information, upon which the assertion is made, accompany the assertion; but even admitting them to have been prevalent, they do not appear to have invariably been attendant on any particular state of the atmosphere, far less an electrical state. It is true the atmospheric electricity was neutral when these diseases were prevalent; but it was neutral twenty times, whereas diseases are only entered as prevalent upon three of these occasions. But in addition to this, during these three days, the electricity was not continuously neutral, but, as stated above, sometimes positive; the barometer and the wind varied; the thermometer is alike (66° F.) in each case in which diseases are mentioned as prevalent; but as there are only three such entries, this fact of agreement is worthless. On examining the entries for "ten days after the fourteenth," I find the same apparent irregularity in all the elements of the weather, and can find no reason whatever from which to conclude that the diseases said to have been prevalent on these days owed their origin to atmospheric conditions.

Mr. Weekes is a man to whom science is undoubtedly indebted and the idea of a register similar to that under examination is an excellent one, but, as I have shown, the conclusions are rashly drawn. Certain conditions remain unfulfilled, and although such observations under those conditions are of the highest importance, and indeed a necessity, unless those con-

ditions be fulfilled they are valueless. It is not therefore because I undervalue the labours of Mr. Weekes that I have chosen his register for criticism, but it is rather because his experience both as an electrician and a surgeon render him a prominent exponent, and in fact authority, on such hypotheses as those under consideration. He may be considered to have a full knowledge of both medicine and electricity, and hence to have made the most of the case. On reference to later authorities, I find no mention of any established fact with reference to the direct influence of atmospheric electricity on particular diseases, nor its influence on epidemics. On reference to De la Rive (*Traite de l'Electricité*, Paris 1858,) I find the following:—

" L'Electricité atmospherique n' agit pas sur l'homme " uniquement par la foudre ; il suffit simplement que le " temps soit orageux et l'atmosphere chargée d' electricité " pour qu' il en résulte un effet sur l'organisme, les individus " sain et bien portants ressentent un malaise, une agitation, " une pesanteur difficile à exprimer ; leur système musculaire " est plus paresseux ; les individus atteints de rheumatisme " sentent se renouveler leurs dolours ; les névralgies augmen- " tent d'intensité ou leurs accès reparaissent. En général, les " malades atteints d'une affection chronique ou aiguë éprou- " vent a l'instant d'un orage une aggravation des principaux " accidents, ils sont plus fatiquès, plus agités, et leur état " fébrile augmente. It est bien probable que ces différents " effects tiennent à l'ecoulement d'electricite qui se fait à " travers le corps pendent les temps orageux, écoulement qui " ayant lieu à travers tous le corps á travers les nerfs aussi " bien qu' á travers les muscles, trouble l'equilibre qui existe " dans l'etat normal et par consèquent doit activer ou contra- " rier certaines functions dependent de l'influence nerveuse."

This is the only reference to the production of an abnormal state of the system by the direct action of atmospheric electricity other than that produced by lightning; and considering the exhaustive character of the electro-physiological portion of this work, and the length of the list of works on the subject given at the end of the chapter in which the above extract occurs, this extract should be a just statement of the extent of our knowledge of the subject. But admitting the statements made to be true, the explanation is very inadequate, being confined entirely to assigning an electrical cause to the effects ; but

a storm is not merely an electrical disturbance, and I submit it is far more reasonable, admitting the effects, to consider them if due to atmospheric disturbances rather due to the sum of the altered conditions than to any one of them in preference to another. And knowing the part played by the skin in giving off moisture, &c., and the diminution which must take place as the air becomes nearer saturation, altered in temperature, &c., it is evident, that apart from the electrical disturbance, the effect might be predicated from the attendant circumstances totally independent of such electrical disturbances. And this renders it certain (so far as the present extent of our knowledge permits of certainty,) that in most of the cases at least, electricity plays a very subordinate part indeed, if it act at all, in producing the disturbance assigned to it. But the facts themselves cannot be received or proved in the absence of the particulars upon which they are based; and it seems to have been lost sight of by the author, that a fact of this nature requires a most extensive and protracted series of observations to establish it; that these observations present innumerable difficulties; and the evidence, consisting partly, as it necessarily must, of the statements of unscientific persons, is, unless the observations are taken on a most extended scale, peculiarly liable to error.

It is generally admitted that the state of the weather may produce sensations of oppression, &c.; but as we have not sufficient evidence collected as to the absence of these sensations in fair weather to enable us to eliminate chance, and as the term 'change of weather,' implies generally an alteration in the Hygrometric, Thermometric, Photometric, Barometric, &c. conditions,—all of which may, and most of which are proved to, affect the eliminative processes performed by the skin, lungs, liver and kidneys,—it is far more reasonable to consider each particular case on its own merits, and to explain it upon the theory generally received by physiologists, than to make an assertion of the general prevalence of the effect, and select one from the host of altered conditions and assign that as the cause of the phenomena. Notwithstanding then the high authority from which the above paragraph is extracted, as M. De la Rive has departed from the rule almost universally adhered to by him, and has not given the evidence upon which the above assertion is founded, and as the conclusion drawn is not legitimately drawn from any stated facts, but bears primâ facie evidence of being as loosely inferred, as it is stated to be general

in its application, I submit that the statement is valueless.

I have now pointed out, and I hope satisfactorily, that neither Mr. Leithead, Mr. Weekes, nor M. De la Rivo, have established a connection between the electrical state of the air, and the morbid conditions of the human organism. The first wrote a most ingenious theory as proved by acknowledged facts. The second was an accomplished observer who believed he had discovered the sought-for connection, or rather demonstrated its existence. The third, in a most exhaustive work on theoretical and applied electricity, in the compilation of which every other work of importance on the subject appears to have been consulted, gives only a few lines out of three thick volumes to point out the connection, and these few lines are a mere assertion without proof, the generality of which lays it open to suspicion; and the effect to be explained admits of an explanation which we are bound scientifically to accept in preference to that offered, as being to a certain extent substantiated, while that offered is a mere assumption, as far as I can see, unsupported by any evidence whatever.

In Noad's Manual, dated 1866, I can find no mention of abnormal conditions of the body being caused by electrical atmospheric disturbances, other than those constituting thunder storms. Neither Sir W. Snow Harris', Nichol's Physical Cyclopædia, nor any other work I can call to mind, makes mention of such influences; and if such an important fact had been demonstrated, it is exceedingly curious that it should be so omitted. But the truth is that no such fact has been demonstrated, no series of observations sufficiently extensive, having been undertaken to establish such a connection. The exact state of our knowledge of atmospheric electricity, as bearing on this subject, I will briefly examine further afterwards, with some faults common to direct influence hypothesis generally; but I will first examine into the direct hypothesis put forward by Mr. Wilkins in the last Number of this Journal, and dignified by him by the name of a theory.

Although Mr. Wilkins has headed his paper "Thoughts on the Etiology of Cholera," on perusing it I am led to the conclusion Mr. Wilkins considers his hypothesis that one which should be adopted in preference, as being more in accordance with observed phenomena than any other

hypothesis advanced; and that it is a particularly happy hypothesis, as compared with that of a specific poison which Mr. Wilkins dismisses as unphilosophical. Unfortunately I am not (as mentioned already) in possession of such a collection of papers on the subject as would enable me to deal with it as I would wish. I shall therefore confine myself, as a final instance of direct electrical hypotheses, to an examination of the hypothesis advanced and supported by Mr. Wilkins—an hypothesis which is eminently unphilosophical.

Referring to the three rules given above, I shall show that this hypothesis is contradictory both internally and externally; that it does not consequently explain the phenomena it is said to explain, (which may mostly be explained more completely by known physiological laws without the aid of any hypothesis whatever); and that it is itself dependent on another and obsolete hypothesis.

It is contradictory internally. At page 323, third para., it is supposed that coagulation of the blood is an effect of loss of electricity, (?) and that the coagulation is proportionate to the electricity lost; but in the next para. the blood is supposed to have retained its fluidity owing to its having lost a considerable quantity of its electricity; or opposite effects have the same cause assigned to them.

The hypothesis is also contradictory externally. The action of noxious exhalations in inducing cholera is explained by the supposition that they prevent the blood being charged with electricity, whereas the chemical action, to which these exhalations are due, gives rise to electricity, and would tend to favour electrization, by actually developing an electrical charge; in fact one of the sources from which the air derives its electricity in the first instance is this "putrefactive decay of organic matters." But Mr. Wilkins states (page 331) his belief that "effluvia of themselves do not give rise to cholera," whereas, if his assumption were correct, that they prevented the blood obtaining its necessary electrical charge, then on his own showing *they should* produce cholera. Mr. Wilkins has supposed that when the air has a negative electrical charge it has lost its electricity. He explains cholera on the hypothesis of "*a negative electric state of the atmosphere,*" (p. 321) and in another place (p. 322) uses the terms "rendered minus" as equivalent to "being deprived of its electricity"; this, if properly interpreted, shows an ignorance of electrical science.

Electrified negatively does not imply loss of electricity, nothing can lose its electricity; positive and negative are relative terms, signifying different electrical conditions, not presence and absence of electricity, and these terms originated with an hypothesis now obsolete, and hence are objectionable, and likely to mislead. As Mr. Wilkins has quoted Mr. W. Leithead's work, and appears to have accepted his conclusions, it is probable he has accepted this obsolete hypothesis, for at the time Mr. Leithead wrote his book, the hypothesis alluded to was generally accepted, and it is within very few years that the hypothesis, considering electricity as a property or condition of matter rather that a subtle ether pervading matter, has been generally accepted; in fact, losing its electricity considered as giving something up is absurd, when considered by the light of the latest electrical hypothesis. Professor William Thomson, in a paper read at the Royal Institution, (I regret I have not an English report of this paper and am hence compelled to quote from a French translation, *Annales de Chemié et de Physique, Fevrier* 1866, *page* 170,) referring to the state of our knowledge of the nature of electricity, said: "Nous savons qu'il n y a pas de matiere calorique; que des movements imperceptibles produisent les dilatations indiquées par le mercure et ecitent en nous la sensation de la chaleur; que le feu n' est pas contenu dans le charbon pas plus que dans cette bouteille de Leyde ou dans cette balance il y a dans chacun de ces objets *un feu potentiel.* Si la force électrique dépend d'une action residant dans la surface et résultant d'une tension intérieure nous pouvous concevoir que l'électricité elle meme doit être comprise, non comme un accident, mais comme une essence de la matiêre. Quelle que soit la nature de l'electricité, il parait entiérement sûr que l électricité en mouvement est de la *chaleur*, et qu'un alignement determiné des axes de revolution dans ce mouvement est le magnetism." Faraday's conclusion is "that non-conductors as well as conductors have never yet had an absolute and independent charge of one electricity communicated to them, and that to all appearance such a state of matter is impossible."

The assumption that electricity in the air inspired charges the blood, is contradictory to the law of the free charge of a conductor being confined to the surface of that conductor, the existence of which law may be conclusively proved by innumerable experiments; but those of Faraday and Biot

alone, demonstrate its existence beyond dispute, and conclusively prove, that no electrical charge could be communicated to the blood in the manner indicated. The hypothesis that the coagulation of the blood is due to a loss of electricity is at variance with observed facts. Blood coagulates if enclosed in glass vessels protected from contact with external air or electrical conductors; shaking in a bottle delays coagulation, whereas rest is favorable to it; is there any electrical difference between these conditions? Cold retards, and some salts prevent coagulation; are the electrical conditions different in these cases? That a loss of electricity may occur during coagulation I do not deny; but this cannot explain the coagulation, as, under similar electrical conditions, it may be retarded or prevented, a fact which proves electrical are not essential conditions of coagulation.

The electricity of the blood is believed by Mr. Wilkins "in a great measure to keep up the polarity of muscle," whereas, the polarity of muscle (electrical polarity) is due to the electricity of the muscle itself, and owes its origin to the chemical action taking place in the muscle. Mr. Wilkins states also that the vigour of the animal constitution is due to electricity and nerve force; he quotes six words from a paper by Dr. W. Phillips, from the Philosophical Transactions for 1815, in proof of his assertion, and further states that some physiologists regard nerve force "as probably identical with the electric fluid." Now, with due deference to Mr. Wilkins, his assertions do not prove anything, and physiologists neither believe animal vigour to depend on electricity, nor that electricity and nerve force are identical. When electro-physiological science was in its infancy, men were naturally startled at every new discovery and exaggerated its importance; not a few thought they had discovered an ultimate principle of organic action. Dr. Wilson Phillips in his earlier researches tried to prove that the circulation of the blood and the action of the involuntary muscles are independent of nervous influence; but the conclusion he arrived at was, "Galvanism seems capable of "performing all the functions of the nervous influence in "the animal economy; but obviously it cannot excite the "functions of animal life, unless when acting on parts "endowed with the living principle." (*Noad's Lectures, page* 241.) The experiments performed by Dr. Wilson Phillips are certainly curious and instructive, but his conclusion

as to the identity of electricity and nervous energy, is not received by physiologists, who, on the contrary, suppose nervous energy and electricity to be correlative, but not identical. That they are not identical is conclusively proved by the fact that the conductivity of nervous matter is not more than one-fourth that of muscle *(Matteucci)*; that the tying of a nerve, although its electrical conductivity remain unaltered, destroys its nervous conductivity; that removing a portion of a nerve and supplying an electrical conductor in such a manner as to restore the electrical continuity in the nerve fibre, destroys its conductivity for nervous energy; that the velocity of nervous energy is only about 30 yards per second *(Hemholz)*; whereas that of electricity is given at from 288000 to 1430 miles in the same time; that the fibres are not insulated from each other for electricity, whereas they are for nervous energy; that all attempts to prove the existence of an electrical current in a nerve during the conveyance of motor impulse have failed, although sought for by Matteucci in the very large crural nerve of a horse; a negative result obtained by so eminent an experimentalist and discoverer, with the most delicate instruments, is in itself almost conclusive. Dr. Abernethy, notwithstanding his knowledge and skill as a surgeon, is no authority on this subject, and Carpenter, Huxley, De la Rive, Matteucci, &c. with more materiel, hold an opposite opinion.

. Mr. Wilkins states, page 322, that the vigour of the animal constitution is due to electricity in conjunction with nervous force; if Mr. Wilkins will prove this proposition, he will justly gain a high position as a discoverer, for if reference be made, it will be found that physiologists state no such thing, at least in more modern works. I cannot find this in Dr. Carpenter's works, nor do I remember either hearing this principle stated by Huxley or Marshall during the time I attended their courses, or having read it in any work on physiology, I have ever had the pleasure or labour of reading. What I believe to be the opinion of modern physiologists on this point (the grounds for which opinion almost any elementary physiological work will supply) is, that the vigour of the animal constitution depends ultimately on the action of the physical forces upon organized matter; that the physical forces are heat, electricity, chemical action, &c., and not electricity more than the others; and that proximately it is at any given instant the result of the difference between

the cell life and cell death in progress at that time. I am perfectly well aware that most physiologists consider other systems of the animal economy as subservient to the nervous system, but they also consider the nervous system as part of the "animal constitution," owing its vigour to the same causes as those to which the vigour of other portions of the economy owe theirs. It is manifestly absurd to suppose that the animal constitution owes its vigour to the force developed by a part of itself, which force constitutes its energy, and that electricity is more concerned in conjunction with nervous energy in producing this vigour, than chemical action, heat, or other physical force.

Mr. Wilkins, quoting from Mr. Reid, states that air becomes changed from the positive to the negative electrical state by respiration, and that "various respectable authors" assume "the general principle of the absorption of elec-" tricity by the blood in its change from venous to arterial "blood in the lungs."

That the air becomes changed from the positive to the negative electrical state may be admitted, but if it has changed its electrical state, it is no proof electricity has been absorbed. M. Pouillet and others have shown that evaporation from chemical solutions gives rise to electricity independently of vital action; and as the earth and conductors connected with it are generally charged, the change might be explained by the altered charge being communicated by contact or developed by chemical action or evaporation going on in the lungs. As to the respectable authorities, it would have been better had they been named either by Mr. Reid or Mr. Wilkins, as it is the person asked to believe with whom judgment of the respectability of the authority quoted should legitimately rest. I must admit I never found such a principle even enunciated, leave alone admitted, by any respectable authority I have studied, and I have examined several without finding it. But even if admitted by respectable authorities, Mr. Wilkins is certainly expecting too much, in expecting that in quoting some author who quotes (very indefinitely) from others, but without giving the evidence by which the statement made is proved, he will do anything towards strengthening his own case: but Mr. Reid simply states that the respectable authorities alluded to "assume" the fact, even they are not said to prove it or offer evidence in its support. On examining

further, I find Mr. Reid destroys his own authority by reasoning thus, "Nature does nothing in vain; there is no substance in the whole animal economy with which we are "acquainted that does not answer some important end, and "we cannot for a moment suppose that the most active and "momentous principle in nature can thus be commonly "taken into the system to remain in it inactive and useless. "It may then be strictly inferred that the supply of electricity is necessary to the animal economy, and that the "diminution and suppression of it may produce disease or "death." The assumption of what is useful, it has been shown again, and again is not admissible into scientific discussions; but without questioning the kind of assumption, admitting that nature does nothing in vain, how far is Mr. Reid justified in assuming that electricity is the "most active and momentous principle in nature?" Why should not chemical or mechanical force be "most active" and "momentous?" But can it be strictly inferred from the fact of electricity performing *some* function, that therefore it is "necessary" and its "diminution or suppression" may produce disease or death? Let it be admitted that it is not taken into the system to remain inactive and useless, then I submit it cannot therefore be inferred that *it is necessary*, but simply that it performs some office which might, so far as the proof goes, be a very subordinate one indeed. That its diminution or suppression may cause disease or death, is directly disproved by the very common experiment that persons may be strongly charged either negatively or positively, so strongly indeed that their hair shall stand out, sparks be taken from them, &c. without injury. I have been frequently so charged myself and noticed no ill effects. But I have before shown that atmospheric electricity does not change the blood, and a moment's consideration will show that Mr. Reid has made use of the single fluid hypothesis, an hypothesis now rejected as not explaining all observed phenomena.

Mr. Wilkins in explaining how man is robbed of his electricity (?) by air, seems to have forgotten that air is a very bad conductor indeed, and would not take away the electricity as he supposes; on the contrary, in accordance with the laws of electrical induction, if the air were negative, the man would, as forming a portion of the earth's surface, be rendered positive by induction, and not negative as Mr. Wilkins

states. I would here again point out that deprived of electricity and rendered minus (negative) are not the same thing in other words, unless an obsolete hypothesis be adopted which would destroy all Mr. Wilkins' reasoning at once. Far from what Mr. Wilkins states being true in this respect, man is almost always in an electrically neutral atmosphere, for, from three to five feet from the earth, the air is neutral, and in close cities this neutral stratum must extend much higher; hence, if Mr. Wilkins' hypothetical cause is assumed to be the true cause, it will be necessary for him to point out why almost the whole race has not succumbed to Cholera, and why it is not always present in the neutral atmosphere of narrow streets, courts, &c.

Admitting Mr. Wilkins' hypothesis, then cholera should be rife when the air is damp and fitted for carrying off free electricity from the body, instead of so frequently committing its worst ravages for months together during the dry season, as it frequently does, and as is stated by Mr. Day as the result of observation at Kurnool. But a fact which disproves the truth of Mr. Wilkins' hypothesis is that Cholera very frequently disappears on the approach of wet weather, a time which, according to this hypothesis, should increase its destructive powers by increasing the conducting power of the air. That it may appear in an unusally dry season I have myself witnessed in some cases which occurred at Balasore, at the latter end of the last drought, to which is due the failure of the crops, and the present famine.

Mr. Wilkins has assumed coagulation of blood is proprotional to the quantity of electricity lost. I have pointed out above that coagulation does not depend upon loss of electricity, but is affected by various agents and conditions independently of any free electrical change it might possess.

In assuming an altered polarity in muscle, Mr. Wilkins should have quoted some experiment in favour of his opinion, as it is opposed to experience, for in no case has the polarity of muscle been found reversed, and observers agree in stating that the polarity of muscle is invariable.

Mr. Wilkins has likened death caused by Cholera to the effect of lightning, but in the vast majority of cases of the latter the blood does not coagulate, nor does any cadaveric rigidity set in after death, these occurring only (according to M. De la Rive) when death is a secondary result of the shock,

as injury to a vital organ; but the reverse is the case in Cholera, the blood being almost universally found in clots, and the cadaveric rigidity setting in, I believe invariably. Coagulation does not occur in asphyxia caused by breathing noxious gases, is this a result of loss of electricity; if so, how is it lost? Mr. Wilkins states that during a negative or neutral electrical state of the air "dead organic matters putrify rapidly." This I do not believe, I never remember seeing such a statement made as proved in any work on the subject, nor can I find it on reference to the best authorities, De la Rive, Noad, &c., and it appears exceedingly improbable; but, if admitted that dead organic matter putrifies rapidly under these circumstances, I cannot see any connection between this and Mr. Wilkins' hypothesis, for I have before mentioned that man is very generally in a neutral atmosphere. Mr. Wilkins commences to support his hypothesis by stating (as I have shown Mr. Leithead did) that his "explanation will, as far as possible, embrace acknowledged facts." I will point out the contradiction. Mr. Wilkins states Cholera travels westward; and explains this by stating the magnetic equator moves westward; admitting (for argument) that epidemics do travel westward, the explanation is absurd, for the magnetic equator, being a line on the earth's surface, moves with the earth from west to east, not from east to west, as stated by Mr. Wilkins. Mr. Wilkins states the disease sets in "as a rule, after midnight, about two o'clock or thereabouts," and explains this by the "great diminution in the electrical tension of the air which takes place at this time," and he gives, as proof, that by the electrical readings taken at the Kew Observatory during upwards of three years, it was ascertained that in summer the principal minimum took place at 2 A. M. and in winter at 4 A. M., and although he doubts if electrical observations are made in India, he says "but the probability is that the minima, considering the circumstances under which they occur, take place here also at the same time." That there is a greater liability to epidemic disease during the night than during the day is strictly in accordance with known physiological laws, and is a consequence principally of the diminished activity of the system due to diminished respiration. The attacks do not take place at two in the morning but during the whole night. The General Board of Health, referring to the experience of Cholera in England, (*Combe's Physiology*, page 171,) says, "It appears that the great majority of seiz-

ures were between twelve at midnight and six in the morning." In Hamburg the attacks were so generally in the night that when the epidemic was at its height, many persons were afraid to go to bed at all. Dr. Laidlaw's experience of the plague at Alexandria in 1835, was that eight-tenths of those attacked were seized in the night, and he says, " I do not recollect to have been called to a fresh case of plague till between five and six in the morning." But supposing Cholera to commence generally about 2 A. M., Mr. Wilkins' explanation is inadequate, for the laws of diurnal electrical atmospheric maxima and minima have scarcely been established for Europe, and may be true of the temperate zones; but that they occur at the same times in the torrid or frigid as in the temperate zones is improbable, and there is no evidence to judge from; for in places in Europe, where extensive observations have been made, the times of occurrence of these maxima and minima differ, and it is only proved they exist, and the time of their occurrence varies with the season. Mr. Wilkins appears to have misinterpreted the Kew observations, for it is not true that during the three years the principal minimum occurred exactly at 2 o'clock, the fact being that the mean of the observations during three years gave this time; on referring to the plates of the variation of atmospheric electrical tension during four days, viz., from April 27th to May 30th, 1861, as registered by the registering instrument in use at Kew, (*Annales de Chemie et de Physique, Fevrier,* 1866,) Mr. Wilkins will find the minimum referred to occurred at about 5 A.M., 11-40 P.M., 1-30 & 3-50 A.M., respectively, and it must be remembered the specimen register quoted is not selected for any peculiarity it possesses over the register for other periods.

Mr. Wilkins considers his hypothesis receives material support from the fact, that a certain state of the weather precedes and even continues during the prevalence of Cholera. " This state is characterized by an overcast sky, haziness of the atmosphere, probably from extreme humidity." But if Mr. Wilkins will examine further, he will find that although every effort has been made to connect cholera epidemics with a peculiar state of the weather, no such connection has been made out; Mr. Leithead's statement has been already shown to be worthless; Prout found the specific gravity of the air greater than usual during an epidemic, and Glaisher's blue mist is still fresh in the memory of the

scientific world; but these have not demonstrated nor even supplied evidence towards the demonstration of any such connection. Cholera frequently appears in the driest and clearest seasons in India, and disappears with the rains, and India and Egypt having the driest seasons and the clearest skies, are the countries oftenest and most severely attacked by cholera, furnishing evidence against, rather than for, the direct electrical hypotheses.

Mr. Wilkins quotes from *The Lancet* a table of atmospheric electrical states during the prevalence of an epidemic; but without further particulars this table is worthless, and with full particulars it is requisite to compare it with similar indications during the absence and prevalence of similar epidemics, and the absence of such data for comparison would alone render the observation useless, even if the state of the air be admitted to have been correctly observed. With reference to Dr. Pickford's remarks, quoted by Mr. Wilkins, I admit that the prevalence of epidemic disease has been associated with the absence or deficiency of positive electricity in the atmosphere, but I deny that evidence has been produced to warrant the association, and, as I have stated above, cholera occurs frequently during dry and serene weather (during which a positive atmospheric charge of electricity is almost invariably present and of greater tension than during damp or cloudy weather) and disappears with the appearance of rain. Upon what evidence has Dr. Pickford established the law that the mortality is inversely as the amount of positive electricity with which the air is charged? Electrical observations during cholera epidemics have not been numerous and extended enough to prove such a law, even if it existed.

Mr. Wilkins states "that Medical men might consider as "conclusive against an electrical cause of Cholera the fact "that, during the prevalence of cholera, magnets have neither lost their power or exhibited a disturbance, tending "to the belief there was no electrical disturbance of the air "at the time;" but this is of no importance, as the magnetic needle neither indicates the presence nor measures the intensity of atmospheric electricity.

According to Mr. Wilkins' hypothesis, atmospheric electrical disturbances produce Cholera, but this is against experience, for these disturbances occur at every season of the year, more or less, in every part of the globe, and Cholera does not

result; and in epidemics lasting for six months at the same place, it is absurd to suppose that so variable an element in the weather as the free electrical charge of the atmosphere should remain fixed.

Mr. Wilkins ascribes the action of metallic salts, oils and sulphur, in curing cholera, to development of electricity and reduced conductivity, but he does not prove they exert any curative effect whatever, nor has any one else proved this, it being generally admitted that a successful treatment has yet to be discovered.

Mr. Wilkins supposes that noxious exhalations are not the cause of Cholera, but predispose to it by either, "altering in a measure the composition of the blood," or by diminishing the quantity of oxygen and electricity inspired. That putrescent particles alter the blood, and that noxious gases lower the heat and act as poisons, is generally admitted. But Mr. Wilkins' explanation is absurd, for the electrical properties of the air are, so far as at present known, little if at all altered by the admixture of these exhalations, and the diminution in the proportion of oxygen in the inspired air is infinitesimal and not sufficient to explain the effect; for taking the oxygen at 21 per cent., three or four per cent. of carbonic acid formed at the expense of this percentage would be fatal. The diminution of oxygen without the presence of the carbonic acid would certainly not produce the effect ascribed to it; but the proportion of carbonic acid in the worst locality is very far below this,—sulphuretted hydrogen the most poisonous product of putrefactive decomposition is more poisonous still—and hence cannot act as supposed. If exhalations acted in the manner supposed by Mr. Wilkins, people inhabiting hilly districts would be peculiarly liable to Cholera, as the proportion of oxygen in the air breathed by them is less than that breathed by inhabitants of the unwholesome districts of the plains.

Mr. Wilkins' statement concerning the greater frequency of Cholera in towns bordering on rivers is not substantiated by him in any way, and it would require a great number of instances to verify it; for it must be considered that the principal "towns and cities" in the world are "bordering rivers" which, in itself, is probably a sufficient explanation. Evaporation is a great source of atmospheric electricity, and hence, according to Mr. Wilkins' hypothesis, persons living near rivers should not be attacked; and the vapour by increas-

ing the conductivity of the air would render both banks electrically the same, and tend to place the inhabitants of both banks under similar electrical conditions.

There is certainly difference of opinion as to the communicability of Cholera, but the evidence is not summed up in the cases given by Mr. Wilkins, and is decidedly in favour of contagion, although due weight must be allowed to the fact that if those conditions which give rise to the disease in the first instance (whatever they may be), continue to be present, they must reasonably be admitted potent to produce fresh cases without contamination from a case already existant; but it must be remembered that the last Cholera Commission came to the conclusion that it was contagious. The prevention of contagion is the one point in the treatment upon which the medical profession agree, and they are almost unanimous in directing their attention to this, rather than to the cure of those attacked, as holding out more hopes of success.

NOTE.—We have to apologize to our readers for the unsightly appearance of this portion of our Journal. It is due to the fact that during the "imposing" of Mr. Douglas's Article, the matter from Page 94—*a* to 94—*f* was accidentally omitted by the printer, and the omission was not discovered until after the rest of the Journal had been actually

Mr. Wilkins states that the poorer classes are not those most liable to be attacked. But it is certain that it is the poorer classes who violate most frequently the rules of health, and who, by overcrowding and bad sanitary arrangements, render themselves most liable to this disease; and they have suffered most in the late epidemic in London. These facts lay Mr. Wilkins' assertion open to grave doubts. I refer to Carpenter and Combe for proof of the effect of bad sanitary arrangements on epidemics; the latter says the rich are almost exempt.

Mr. Wilkins' hypothesis rests upon another hypothesis, now obsolete—having been rejected as disproved; hence as it violates all the rules laid down above, it is inadmissible. Mr. Wilkins labours to explain facts which require no hypothesis to explain them, being already explained by known

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printed and the type "distributed." Clumsy as appears the above device for supplying the omission, it has been resorted to in preference to the only alternative, viz., reprinting the Journal, which would have occupied considerable time and have further delayed the publication of the present number. —*Editor M. Q. J.*

laws, of these the action of flannel as a prophylactic, and the comparative immunity of medical attendants (?) are good specimens. Cullen has truly observed, " there are more false " facts current in the world than false hypotheses to explain "them ;" *(Hamilton, Lectures on Metaphysics, Vol. I., p. 169.)* and Mr. Wilkins should have remembered this when stating the effect of rivers on cholera epidemics, and the greater liability of Europeans than natives to the disease. The latter if admitted is satisfactorily explained by the native being acclimatised, and differently constituted, and, as a rule, more temperate. The facts of the Niger expedition, 1841 and 1842, are sufficient to prove that difference of constitution would account for such a fact. Mr. Wilkins states " it is not known washermen are more liable to cholera than other persons ;" but they may be, although it may not be known. I may mention that a washerman, employed by me, and several of his family died of cholera some short time ago, and at the commencement of an outbreak. Mr. Wilkins asks why prescribe remedies early if the disease is due to poison ? But whatever the treatment in a disease like cholera, if not treated early, it cannot be treated at all, being so soon fatal, and Mr. Wilkins cannot mean to prove anything from the treatment, for it is admitted that this is unsuccessful, and our *belief* as to what causes the disease is no *proof*.

Our knowledge of atmospheric electricity is not sufficiently advanced to account for epidemics by its direct action, and so far as observation goes, the information we possess is rather against than for any such hypothesis. The greater number who would connect epidemics with the direct action of electricity abstain from pointing out the manner in which it is assumed to act, and none prove that the cause assigned would produce such an effect ; nor can any experiment be referred to proving this point. It also seems to have been generally overlooked that the observations we possess are insufficient to establish a fact so difficult to prove, and requiring so vast a collection of observation from which to infer:—that man is, as a rule, especially in a large city surrounded by a neutral atmosphere; that he is really, electrically speaking, a portion of the earth, and as such is, as *a rule,* electrified negatively ; that it is not the air but the earth which robs him of any free electricity, the vital actions may develope and send to the surface of his body; that atmospheric electroscopic apparatus very frequent-

ly registers rather the conductivity of the air than its free charge; and finally that in localities where cholera is more frequent and destructive, no electrical observations have been taken, and that the reliable observations which have been taken during the prevalence of cholera, are too few to establish anything, even if they appeared to favour a direct electrical hypothesis.

Of the indirect electrical hypotheses, or those which attribute the epidemics to some change in the air having an electrical origin ;—I shall consider one, that one being the only one at present (of all electrical hypotheses, direct and indirect,) which modern physicists regard as rendered worthy of consideration by the evidence adduced in its support. Before I can examine into the merits of this hypothesis, it will be necessary to state it. It is known that ozone is produced by the action of electricity on the air; that it exists in the air more or less at all times ; that having stronger affinities than oxygen, it exerts a similar action to cholrine in destroying miasmata ; that air containing a large proportion of it is destructive to life ; that its principal action is on the respiratory organs ; that it will oxydize substances which ordinary oxygen will not oxydize, and hence may and does by altering the general properties of the air, cause the oxidation of matter in the body, which in its absence would not so readily be oxydised, but retained. Observations have shown that upon some occasions during cholera epidemics, there has been a marked deficiency of ozone in the atmosphere, but these have not been sufficiently numerous to settle the question ; and the observations necessary to show that a deficiency of ozone invariably leads to epidemics have not been made. In the instance given by M. De la Rive, (*Traite de l' Electricité* T. iii. p. 677) in which the results of observations by Mr. Wolf at Berne and by M. Boeckel at Strasbourg are given, there appears certainly to have been a coincidence between the appearance of cholera, and the absence of ozone, upon that occasion ; but M. De la Rive justly remarks, many more observations are necessary to establish a connection. The action of ozone is ascribed to its power of destroying miasmata and there can be no question as to its power in this direction when present in any quantity, but the proportion present in the air must be very small indeed, as one five-hundred-thousandth can be detected by the smell, and the

smallness of the proportion would apparently render some other explanation of its effects necessary. But although it may not itself be sufficient to produce the effect it may by its presence (catalysis) raise the affinities of the oxygen with which it is mixed, and, as it is known that air containing ozone has affinities when air containing no ozone is inactive, it is not unreasonable to infer the possibility of ozone acting as indicated, and that its absence might, by admitting of retention of effete matters by the blood tend to zymotic diseases. But our knowledge of this active agent is very meagre indeed, and consists of the fact of its presence in the atmosphere, a few of its properties, and some modes of producing it; but its composition, its distribution, the laws of its variation, and its effects when diffused in an extremely minute proportion through the atmosphere, are still unknown. And although a deficiency of ozone has been noticed upon one or two occasions during epidemics, these are so few and so little is known of its variation under ordinary circumstances, that it would be very premature indeed to conclude it has really any effect either way; for although it is certain that it is a most powerful disinfectant, it must still be admitted that it exists in extremely minute quantities, except immediately after thunder storms, and that in India where thunder-storms are, generally speaking, far more frequent and violent than in Europe, cholera is more frequently present; and it is certain that those particular districts where thunder-storms are most frequent and violent, even for India, are not exempt from its visitations. In the present limited state of our knowledge of this agent, it would hardly be justifible to found any hypotheses upon its physiological action other than upon that indirect action which it must exert as a disinfectant; but the proportion present in the atmosphere being so extremly small, to assign very extensive action to this proportion except by virtue of its effecting an alteration in the properties of the air itself, would be purely assumption; notwithstanding that it be admitted to have so low a chemical equivalent as oxygen.

I have considered above the two kinds of electrical hypotheses—the direct, and the indirect. Of the direct I have chosen those (with the exception of Mr. Wilkins,) I considered fair representatives of this kind of hypothesis. Mr. Wilkins' certainly contains so many contradictions and mistakes, that these alone have brought it to my notice, and induced

the writing of this paper, but the others had for their propounders men with just claims to be considered well acquainted with electrical phenomena, and their connection with vital action ; but it is necessary to notice that since these hypotheses were advanced, the doctrine of the correlation of physical forces has been generally accepted, and the hypotheses upon which they were raised have given place to a science of pure force.

Of the indirect electrical hypotheses, I have considered that one only to which some weight is generally allowed by physicists, but it must be remembered, the general opinion of those capable of judging, is, that the question has been put but not answered, and that a vast number of observations will be necessary before an answer can be obtained.

Having examined the electrical I will briefly notice some considerations affecting two other hypotheses; one regarding the exhalations from decaying organic matter and retention of effete matter, the other regarding a specific "constitution," in addition to defective vitality and hygyenic conditions, as necessary to the production of the disease. A glance at the facts already known will prove conclusively that some specific condition or conditions require to be fulfilled in order to determine what particular disease shall result from given violations of sanitary laws. That the presence of the products of putrefactive decomposition in the blood must,beyond a certain limit,produce disease of some form, is deduced from the fact that one great function of the blood would be interfered with, that an alteration in its qualities and consequent deterioration of every organ must result. This deduced inference is verified by hundreds of well-authenticated instances, the most striking of which may be found in any good Manual of Human Physiology That the introduction of poisonous organic matter from without may alter the whole of the blood in the body, and through the blood act upon every organ, is proved beyond all doubt by vaccination, inoculation,by accidental puerperal poisoning, and by numberless experiments on animals undertaken to demonstrate the fact.

Now it being admitted that all conditions which import into the blood, or cause it to retain, decaying organic matter, tend to produce disease and death, it becomes a question what is the cause determining what form the disease shall take. To

this unknown cause has been given the name of the "epidemic constitution." Whatever tends to lower the vitality, to interfere in any way with the excretory functions of the skin, lungs, or kidneys, or to import into the blood the products of putrefactive decomposition from without, renders the system peculiarly liable to be attacked by cholera, typhus fever, &c., according to the epidemic constitution; for it is admitted that places which are at one time hot-beds of typhus, during cholera or other epidemics are equally favorable to the development of the new disease; knowing that in cholera the blood is altered in some of its essential qualities, that such alterations are brought about by contamination produced in other cases, either purposely, as in vaccination, or accidentally as in the puerperal poisoning; knowing that the quantity of poison necessary to produce this alteration is extremely minute, so much so as to be inappreciable, it is certain that the introduction of a poison by the breath might produce such morbid alteration in the blood; if it be considered that the exhalations from the lungs and skin of a person already attacked, are quite competent to reproduce the disease in another person with more certainty, as the blood has been already altered by containing noxious matter, the poison hypothesis supposes at least an adequate cause. If a set of conditions are potent to develope a first case, it is reasonable to suppose, that although the dissemination of morbid matter may really assist the spread of the disease, this original cause may produce other cases independently of the first; and as it is certain the epidemic has a beginning somewhere, and this primary cause must, in the beginning, be independent of the disease itself, such discussions as that between MM. de Pietra Santa, Cazalas and Didiot and M. Grimaud de Caux (*Comptes Rendus, tome* lxiii.); in fact, discussions whether or no it was in any particular instance communicated by persons already diseased, are of secondary importance, for such discussions must leave the cause of the disease untouched. If the disease be attributed to contagion, as it frequently is, this is really begging the question. Even attributing the disease to a poison in the first instance, is to attribute it to what must be a proximate cause, for although it be admitted that poison is the cause in the first instance, what is really required is, to what conditions does the poison owe its origin? That products of putrefactive decomposition are favourable to disease is proved; and that a change into camp,

where the conditions are more favorable to the removal of effete matter from the blood by the lungs and skin brings about as a rule a stoppage of its ravages, would seem to favour the opinion that a poison originates in the body itself, and its retention or presence in the air breathed, are the conditions necessary for determining its action, and this opinion is favored by the fact that the inhabitants of the cleanest jail (if overcrowded) are liable to attack, and that on removal to camp, at even a short distance, the disease disappears; but up to the present all that has been advanced has been hypothesis, and we are totally ignorant of the real cause.

A vast amount of time has been spent in collecting facts, and papers innumerable have been written with a view to clear up the mystery; but to discover the obscure cause of a disease, and the success of a given mode of treatment, it is necessary to compare the disease under all circumstances of varied climate, habits, and constitution, and to collect the facts of a vast number of cases. To do this requires not the experience of one, but of all; not the facts of individual cases, but of these in conjunction with those of other epidemics. To compare case with case is undoubtedly useful and is a first requisite in every examination, as deciding the identity of the phenomena, but this evidently cannot lead us to the cause of the epidemic; to find this it is necessary to compare epidemic with epidemic, the Hygrometric, Barometrical, Electrical, &c. states of the atmosphere, the physical features of the countries, the constitutions, and habits of their peoples, and in fact every condition which might influence the health of those attacked, during, and in the absence of the epidemic; to obtain the fullest information for places peculiarly liable to attack, and for those in which the disease never appears. But how is this information to be obtained? If information of such extent and generality could be obtained, it would prove of the most vital importance to the human race, not alone in the matter of cholera, but in all diseases and all modes of treatment, and in knowledge of natural phenomena other than those appertaining to medicine directly. If the labours of individuals are comparatively useless, considered individually, how are they to be combined in order to become useful? Academies cannot do it, medical schools are distinct bodies frequently antagonistic, rather than working together, and an organization quite out of proportion

to the capabalities of either is required. I reply, by a gigantic international organization which need not confine itself to medicine alone, but which might extend its operations to other sciences, in which extended observation is equally necessary to just conclusions. In the way of the formation of such an organized system of observation there are undoubtedly difficulties, but it must be remembered that it is to the interest of every one to further the object of this formation; that all the educated at least would gladly subscribe for such an object; that Governments would lend their aid; that academies would lend the assistance of their organizations, and that with a judicious division of labour, there would be no lack of labourers. By such means all the at present useless observations of individual observers in all countries might be directed and rendered available. Instruments might be distributed, and many more induced to observe, and the many would bear the expense as they reap the benefits of obtaining correct information. The labour of tabulating, classifying, &c. might either be left to individuals, or done by paid officers of the association, but in any case a few years would give such a mass of information as would certainly tend to clear up many existing doubts; and from its mass and the number of observers concerned, would eliminate the chances of error to which the best observers are liable, and those due to the prejudices of the individual observer. All observations might be rendered more useful from being properly directed, and the instruments being uniform and reliable; in few words, the grandest results to humanity would flow from such an organization.

Associations embracing the natives of different nations have been formed from time to time, and Freemasonry exhibits an instance of an association of this kind formed for purposes very subordinate to that of the proposed. The labour might be divided in a manner somewhat similar to that in which it is divided in Freemasonry, a Central Committee being chosen for each kingdom, with subordinate Committees wherever considered necessary or expedient. And with care in framing the tables to be filled in by observers, the classification of the results of observation might be examined by the Sub-Committees, and the great difficulty of classification and tabulation would be thus disposed of. The Medical profession would furnish a numerous, educated, and willing, set of observers who, to medicine at least, might supply sufficient evidence in

a year or so to set at rest many disputed questions of considerable importance; and it appears curious that such an association as that proposed has not already come into existence.

Medicine requires statistics for its basis, for a large proportion of the phenomena it embraces requires an enormous number of observations in order to ensure accuracy in the conclusions to be drawn. But the collection of these statistics being left to unguided individual observers, the majority keep no record at all, and their experience is lost to their fellows, and it is not an uncommon occurrence to find a laborious series of observations rendered almost useless by an important omission, or the observations of different compilers incomparable by reason of the totally different modes of procedure adopted. It might be urged that individual difference of opinion would form an insurmountable obstacle to any such association as that proposed, but it must be considered the object of the association proposed differs from that of scientific associations generally, in being merely the collection and encouragement of reliable observations and not the *discussion* of the observations tabulated; the latter might safely be left to learned Societies and individuals. There can be no doubt of the existence of willing labourers, and the papers (individually useless) which appear in the Medical and other scientific journals, bear witness to an earnest desire to be useful; but there is confusion in the host, and discipline is required to ensure success. The relation of such an association as that proposed to the present system is that of a disciplined army, to an undisciplined mob; and the useless discussions so frequent at the meetings of the British Association, &c. (where assumption, and such inferences from insufficient data as those of Dr. Lankester on infanticide, supply the place of that which alone deserves the name of knowledge, and which is arrived at only by laborious, strict and numerous observations) are some of the fruits of the want of unanimity, exactitude, order and data it would be the object of such an association to induce, infuse, direct, and collect.

ART. X.—*The Etiology of Cholera.* Letter from Surgeon M. C. FURNELL, Medical Officer, Ootacamund.

To the Editor of the Madras Quarterly Journal of Medical Science.

SIR,—In a very able and interesting paper on the "Etiology of Cholera" by Mr. Wilkins, which appeared in the Madras Quarterly Journal of Medical Science for October 1866, and in which, if I rightly understand the author, he contends for a purely electrical cause as the origin of Cholera, as against a contagious poison, occurs the following sentence:—

"It is stated that the two women who visited the town of "Dundee while cholera was prevailing there, were attacked "on their return to Arbroath, as well as the six people who "visited them during their illness. This seems a strong "argument in favour of the prevalent view. *Is it not just "possible that this is an exaggerated account given to a "Medical man who took it for granted, and recorded it as a "fact?*"

Allow me through the pages of your Journal to place upon record the following fact, which it seems to me difficult to explain away on electrical grounds, and which moreover is so recent that Mr. Wilkins can have no difficulty in ascertaining whether it is exaggerated or not. A few carefully recorded facts of the same sort must carry great weight.

In October 1866 the cholera showed itself in Ootacamund, a Sanatarium which has hitherto been singularly free from any epidemic of this complaint. I will relate what occurred by extracts from a letter, *written at the time,* to the Deputy Inspector General:—

"SIR,—"I regret to have to report that cholera made "its appearance in this station on the 11th of this month "(October). It was imported from Coimbatore, that is "to say, the people first affected were all people who had "just returned from visiting Coimbatore* on some religious

* I subsequently learnt the name of the village was Caroomoothan putty, near Coimbatore, and most of the cases were brought in suffering at the time from Cholera.

"festival. Eight cases first shewed themselves ; of these two
" died and six did well."

2. " On the 15th October two more cases occurred. " One in the sister of a man who had cholera, and on whom " she had been in *close attendance*; *this girl had not been* " *to the low country.* The other in a woman who had not " been to the low country either, *but had been visiting in* " *the house of a neighbour where a cholera case had* " *occurred.*"

Both these last cases proved fatal. Then the Cholera stopped.

Dr. Miller, the late able Medical Officer of these Hills, saw these cases with me, and was most painstaking to discover if in these two last fatal cases the patients had been down to the low country, but it was very evident they had not. He had known in his experience of Ootacamund, extending, I believe, over some three years, cases of Cholera imported before, but had never known it to spread.

Mr. Wilkins may be able to suit these two cases to his electric theory, I confess it seems difficult to me to do so. I feel it my duty however to place the fact such as it is on record.

I am Sir,

Yours faithfully

M. C. FURNELL,

Medl. Officer, Neilgherries.

ART. XI.—*On the use of Margosa leaves in Small-pox.* By S. PULNEY ANDY, M. D, Superintendent of Vaccination, Travancore.

AMONG the sacred plants of India the Margosa or Neem *(Azadirachta Indica,* Nat. Or. *Meliaceæ)* is held in veneration by the Hindus as being dedicated to the Goddess Mariatha. This Deity is considered by them to preside over all epidemics, or in fact the epidemics themselves are thought to be a visitation of this Goddess, in honor of whom the Margosa leaves are in common use with the Indians, particularly in cases of Small-pox. The leaves are spread on the bed of, as well as used for fanning the patient, besides a bunch is fixed just above the door as a sign of the presence of the Goddess in the house. However, the medical writings of the Hindus speak of it in a very different light to what is generally believed. The term *Mari* itself is a feminine form of *Maruka,* a Sanskrit word, signifying Death and Epidemic, and it is probable that the ancient Hindus might have deified the destructive tendency of Nature, and classed her amongst their Mythological Deities. Again, the term *Vasuri,* which is nothing but the corruption of an original Sanskrit word, *Masurika,* meaning gram or a disease of gram-like eruptions, is used by the Hindu Nosologists as the generic term for Variola.

According to the writings of Kishi Agastiar, the celebrated sage Physician and Theologian of Southern India, Small-pox is produced as the result of the fermentation of the humours of the body, and he says that the articles generally offered to the Goddess are in themselves a remedy for Small-pox;—thus the use of Margosa leaves is supposed to bring out the eruptions freely, and the others are dietetic agents of a cooling and nourishing nature.

When the remedial properties of *Saracenia Purpurea,* and *Napenthes Distilatoria* (Mr. Loftus' specific for small-pox) were discussed by the Press, it struck me that the Margosa leaves, which have been in use in India from the time of

antiquity, might also be found to possess some virtue, if trials were made. Unfortunately my itinerating life did not offer me an opportunity of experimenting until April 1866.

In the course of my first circuit to Alwaye, a place greatly resorted to by the natives during the hot months for health, in the northern extremity of Travancore, I came across a few cases of Small-pox left neglected by their friends and thrown out on the plains under the shelter of cadjan sheds. In the absence of the other drugs referred to, I took the opportunity of prescribing the Margosa in the following form :—

Take of

Tender leaves of Margosa (Azadirachta Indica), or Davanam, the leaves with stem of Artemisia Austriaca,

Liquorice root, of each an equal quantity.

Mix and grind up to a mass with a few drops of water, and divide into pills of five grains each.

I ordered a pill to be given three times a day. They were tried in six cases; all were of confluent form in adults. Two of them were on the 4th, three of them on the 7th and 8th, and the other on the 15th day of the disease. With the exception of the last patient who died of exhaustion the same day that the medicine was administered, all recovered.

When I visited the same locality in November, after a period of six months, there were also eight cases of Small-pox, and their friends, on hearing of my arrival, came and begged of me for the pills I gave during my last visit. With the exception of one case of a malignant type in a man aged 50, who was in a dying state when I took him under treatment, the rest of moderate severity also recovered.

As far as I had an opportunity of testing the drug in these 14 cases, it appeared to be beneficial,. when administered during the premonitory and progressive stage of the disease, and to be of little or no use after the eruption had passed the stage of maturation. It seemed to decrease the severity of fever, facilitate in throwing out the eruption freely, and alleviate all other sufferings usually experienced in this disease. In fact, the patient expresses himself as passing through the several stages of the disease with comparative ease, without much pain or uneasiness.

I simply bring forward the facts as they occurred to my observation, and I now leave it to other members of the profession to give a fair trial of the drug, as opportunity offers them. Owing to the nature of my itinerating life, I scarcely find opportunity, or command sufficient time, to watch the effect of the drug or the progress of the disease under its influence, to note down observations and to collect satisfactory statistics on the subject. I shall feel obliged to any one who may undertake the trial on an extensive scale, and publish the results whereby greater light may be thrown as to the real value of the drug in this most loathsome disease, Small-pox.

In places where fresh plants cannot be had, I would suggest the use of the dried tender leaves of Margosa either in the form of infusion or decoction, with the other ingredients in the prportion of a drachm each to a pint of water. The dose for an adult being one ounce of the decoction twice or thrice a day.

PART II.

REVIEWS AND NOTICES OF BOOKS.

Report on a Project for the Drainage of the Town of Madras. By Captain HECTOR TULLOCH, Royal Engineers. Madras, Gantz Brothers, 1865. Crown 8vo. pp. 120.

Second Notice.

CAPTAIN TULLOCH'S fourth chapter is headed "objections to sewers answered." Mr. Cornish's name might very well have preceded the word "objections", for our author says :—

"Fortunately these objections have been very fully stated by the same officer who has pleaded so strongly on behalf of universal dry conservancy."

This chapter occupies thirty pages of the Report, so that it may be concluded that the objections are thoroughly considered. It opens with the following paragraph, which we think incontrovertible, and the second sentence of which we fear might have been written in the past rather than in the future tense and subjunctive mood.

"At the present time when sanitary questions are attracting great attention, it is of vital importance that the general principles of water-supply, drainage, barrack-construction, &c. should be thoroughly discussed. If mistakes are made at the outset in carrying out large and important works, the chances are that they will be repeated over and over again, and at an enormous cost to Government. Whereas, if the correct principles of any one subject are clearly defined, there is every hope of their universal adoption. As this is the first project which has been submitted to the Madras Government for the complete drainage of a large town in the Presidency, it would be a grievous error to carry it out if it should be based on erroneous theories. On this account, therefore, I have considered that I should be discharging my duty to Government better by omitting nothing in this Report bearing on the question of drainage, than by confining myself strictly to the immediate subject matter."

The first objection which Capt. Tulloch notices is that the rivers in Southern India do not flow all the year round, and that therefore there must always be an insufficiency of water for flushing sewers. To which is given the answer :—"If sufficient water is stored in the monsoon and when the rivers *are* flowing, there need be no lack during the hot months." The source of all water, generally speaking, in every country, is the rainfall, and in India, on the average, this is double that of England. And after making due allowances for loss by evaporation, there is an enormous balance of water available for the use of man. The importance and success of store-reservoirs is pointed out; and we opine that could Capt. Tulloch have foreseen, at the time he was writing, the long drought of the past year and the resulting famine, we should have had some words of warning as to the great insufficiency of the present existing tanks for purposes quite independent of any drainage system.

It is quite right that "the quality of mercy" should be called into play to feed the starving poor, but would it not be more politic to do all that human power can effect to avert the chance of the failure of the food crops?

That Capt. Tulloch is quite right as to the sufficiency of water in Madras, our experience during the late rainy season has entirely proved. The abundant rain produced such an overflow of the Cooum that the town was completely flooded in many parts, and as no sufficiently capacious store reservoirs exist, and the upper part of the river is not dammed—Colonel Miller's dams were never effectual, and no attempt has been made to render them so—the usual course of letting the fresh waters, we so much need, escape into the ocean had to be resorted to, with the usual effect, viz., that the stream rushed sea-wards with such rapidity that the upper waters only escaped leaving the filthy lower stratum and the solid sewage poured therein at the bottom of the river-bed. And now we have our nostrils once more assailed with the disgusting odours emitted from one of the great cloacæ of Madras.

Capt. Tulloch gives a list of the principal towns in the Eastern Districts of this presidency, which is intended to show that an ample water supply is available for them, if proper storage works existed. He omits the towns on the Malabar side, as hardly any one would maintain that there is an insufficiency of water on the Western Coast. And he concludes this section by saying :—

"So far as Madras is concerned, there need be no anxiety about a deficiency of water for flushing purposes. I could only wish that there was not so much available under the surface as there is, because the cost of building the sewers is proportionately increased. The flushing arrangements will be most complete and will cost nothing after the sewers are once built."

The next objection is contained in the question "Where is the sewage to go to?" and in the reply "To the rivers." Mr. Cornish says:—

"The great rivers, the Godavery, the Kistna, and the Cauvery, which contain more or less water throughout the year, do not run near to many populous towns, and are practically unavailable for the purpose. Along the Coast, sewage might probably be pumped into the sea, but the difficulty would still remain with inland towns such as Bangalore and Secunderabad."

And Capt. Tulloch replies:—

"The error in this reasoning lies in supposing that rivers, as outfalls for sewers, are a *necessary* part of the sewer system. They form no part of it at all. It is indeed unfortunate that in so many instances in England sewers should have been led to rivers, but this is not the fault of the sewers but of the people who built them. * * * * All sewage, and especially in this country, should be returned to the soil—to the same place where the solid manure of dry conservancy is to be conveyed. Those who are so anxious to preserve urine and fæces as manure should not forget that, after all, they cannot manage in India without water, which must descend as rain or be raised artificially before crops can be made to grow. The only difference, so far as the agricultural part of the question is concerned, between solid manure and liquid sewage, is that in the first case you have an article which is almost useless by itself, and in the second you have nearly all that is required to produce anything. The mistake lies in reasoning from England to India without considering the different conditions of atmosphere, soil, &c. prevailing in the two countries. In England it is raining more or less throughout the year, and the first question which the agriculturist puts to himself is, "How shall I get rid of the water?" In India it rains for about 20 or 30 days, and the first question the ryot asks is, "From where shall I get water?" The soil in England in its normal state is saturated with moisture, and every effort is made to keep it dry. The soil in India is dry, and every effort is made to keep it moist. Sewage is manure in a diluted state. But its use even in England, *now that they understand how the sewage should be applied, and what crops should be grown under it,* is almost uniformily successful and is advocated by the greatest authorities."

Capt. Tulloch then quotes from Mr. Cornish's pamphlet to the effect that practically the liquid sewage system in Europe has failed as regards its use to the agriculturist, the more valuable portions of the sewage being decomposed and dissipated, leaving but a fetid fluid behind no more fertilizing in its properties than ordinary river water; and he proceeds to show that Mr. Cornish is in error and that the evidence in England now all inclines the other way. He instances the case of Edinburgh where, by the use of sewage, land has risen in yearly rent from £2 to £6 per acre, to from £30 to £40 per acre. At Clitheroe in Lancashire the fertilizing properties of sewage water are four times as great as those of common farm-yard manure. At Mansfield, Nottinghamshire, rent of land has risen from 4*s.* 6*d.* to £14 per acre. At Ashburton, Devonshire, sewage irrigated land produces £8 to £12 rent per acre, whilst ordinary land produces only £1-10 to £2. At Croydon the success has been complete. Other instances are mentioned, and we are told:—

"Every year the use of liquid sewage in England increases, and the *belief in its value is now general.* It is not a perfect manure, but no substance can possibly be a perfect manure. All that should be contended for sewage is, that it has great fertilizing properties."

We lately met with the following extract from the *Sunday Gazette*:—

"*London Sewage.*—The Reclamation Company now actively engaged on the north side of the Thames, has already tested the value of the metropolitan sewage, and contemplates its regular and systematic utilization on a farm which the company is about to purchase. Early in April last a plot of waste-land at Barking Creek, devoid of surface soil, was covered with common sand, brought from Mappling, near Shoeburyness, to the extent of two feet thick, on which was sown grass seed. The surface was then well irrigated with ordinary London sewage from the northern outfall. This has been repeated once or twice. The effects of this manufacture of green meat—for such indeed, it may be most justly considered—has been the production of three crops; one cut in June and July, at the rate of sixteen tons per acre; a second of eight tons; and a third, now growing, and almost ready for the scythe."

It is but right that this matter should be fully considered. Nothing but actual experiment can furnish data for argument; no chemical theories as to the decomposition of phosphates and other salts and evolution of ammonia can possibly

avail in judging of sewage utility. Upon this subject we would refer our readers to an article entitled *Sewage and Sewerage* in the number of the *Quarterly Journal of Science* for April 1866.

We have four distinct plans of removal of sewage matters advocated in this country. The Punjaub or dry system; the dry earth system; the half dry, half wet system now carried on in Madras, with manure carts and open drains; and the sewer system. The able writer in the *Quarterly Journal of Science* says:—

"Of the various plans for removal of sewage, the simplest is that which merely takes it away without the addition to it of any water or the admixture with it of any disinfectant or deodorant substance. It has or might have its place and application in regions where from extreme drought or extreme cold, water is not available for the same purpose and labour is cheap. In a populous town and a civilized country the water-tight carts which would be necessary for carrying out such a system would be so numerous as to block up the streets, and whilst thus rivalling all other modifications of the dry-method in cumberousness and expense, it exceeds them all considerably in offensiveness. * * * *

"On the other hand, it is right to say that Sir Joseph Paxton, though, as a horticultural physiologist, he was fully aware that 'plants could not take up solid manure in its crude form, the spongioles becoming ulcerated by contact with it, and that therefore an application in a diluted form was the application by which plants were best supplied,' did, in his evidence given before Dr. Brady's Committee, hint that mechanical science might one day make a removal in this way very possible 'without our ever knowing anything about it or having the slightest possible smell in the house.' 'In the diluted form,' he proceeds to say, 'it is very valuable, but in the solid form it would be commercially much more valuable.' * * The Japanese and Chinese are ordinarily taken as illustrations of the success which may attend the adoption of this plan; and we are far from thinking that we may not learn many valuable lessons from nations whose vast experience and urgent necessities must have forced upon them so many lessons of ingenuity and economy . . . but in this matter of the utilizing of sewage, we are inclined to think that the difference of our social conditions renders their example inapplicable to us. It is their habit to dilute their manure very largely even though not so largely as the forty gallons of water per head of London extravagance, before they apply it to the land.

"The poudrette of the Patent Eureka Company, on the other hand, is sown broadcast over the land in a dry form, a plan which

we think contrasts to disadvantage with these oriental methods, and which must ultimately impair somewhat the success which, we learn, has been considerable in the town of Hyde. Even the Chinese 'have the idea that manure, whether the production of bipeds or quadrupeds, if applied to land in a dry state, burns the plant." '

But to return to Captain Tulloch. That he has taken into consideration some of the points considered in the foregoing extract is shown by the remarks which immediately succeed his proofs that liquid sewage is usefully applied to agricultural purposes in England.

"If all this can be declared of England, where already there is too much moisture in the soil, what wonderful fertility might be produced with sewage in India? Pour water on the land—flood it if you like—and what is the result? A succession of crops. Would not better crops be secured with water mixed with manure? It may be granted that solid manure, bulk for bulk, is more valuable than sewage. But that is not the point at issue. The point is, whether solid manure in a dry country like India with 20 or 30 wet days in the year (Dr. Cornish says 12 days only, which is all the better for my argument) is worth 20 or 100 times its bulk of sewage, which, according as 5 or 20 gallons of water are used per head of the population, I have already shown, it will amount to. And even this is not putting the case fairly, because every pound of solid manure will have to be carried to the fields, and then spread and mixed with the soil by manual labour, whereas liquid sewage can be applied to the land by simply opening a sluice. Thus drainage works in India should be looked upon as works of artificial irrigation—that they will ultimately become so, I have no doubt whatever. The land will make its claim good to every drop of water and every ounce of manure, in spite of all that may be done to prevent it. It will, in the proper place, be shown in how remarkably favourable a position Madras is situated for the utilization of its sewage."

Capt. Tulloch omits to enforce his argument by saying here, although he has previously noticed the fact, that even when solid manure has been applied to the arid soil of India, it will simply be destructive until its dilution with water has been effected. Our author is quite right when he says "the mistake lies in reasoning from England to India without considering the different conditions of atmosphere, soil, &c. prevailing in the two countries."

By and by we shall show that, in giving the details of his project, Capt. Tulloch most materially weakens the argument of the above extract, by proposing to exclude

excrementitious matters altogether from the sewage he proposes to utilize.

Capt. Tulloch answers the question "Where is the sewage of inland towns to flow to?" by saying in effect;—"Utilize it,—return it to the soil."

The next objection is, that costly drainage works will never keep the town clean of ordure, for the simple reason that natives will not sit upon or use water-closets. And Captain Tulloch asks:—

"Are we then to suppose that sewers were introduced to suit water-closets? Until now it has always been believed that water-closets were introduced to suit sewers. But why will not natives use water-closets? and how has this been ascertained in Madras? Perhaps they object to sit on them in the same manner as Europeans. Nothing would be easier than to design water-closets to admit of natives sitting with their feet on the seats. . . . . .

"Whatever may be said to the contrary, that system of conservancy is the best which, provided it is not injurious to health, can dispense with the employment of men and women on duties which no human being should be called upon to perform. Water-closets require no toties, and 40 men could easily look after all the sewers of Madras. But dry conservancy in Madras would require that 4,000 of the inhabitants should be engaged in one of the most disgusting of occupations. The use of water-closets, however, is altogether beside the question of drainage. Whether the excrement is removed by means of them or is carried away in carts, the sewers will still have quite sufficient work to do."

We shall have something to say about water closets further on.

The next objection to sewers is that the materials of which they are composed are absorbent, that the watery parts of the sewage are taken up by the soil and the solid refuse left to choke the channels. And Capt Tulloch replies:—All very true as regards Madras, but nevertheless the English model of sewage has never been attempted here. "In the project now submitted, I have provided that steam-pressed bricks only shall be used, and that they shall be set in hydraulic cement, and that the sewers shall be lined *throughout* with a coating of asphalte. The subject of materials is so entirely a professional one, that I will not pursue it further in this place." And he proceeds to show the utter dissimilarity between the Madras open and unsloped drains, and a scientifically-built system of sewers.

The next objection to sewers is that they create a great nuisance.

"This nuisance is an objection to all systems of conservancy. Where foul matter is disposed of, there must be more or less smell. Latrines on the dry conservancy principle are not inodorous but merely less offensive than those in which water is used. Sewers remove *all* liquid refuse with a little nuisance. Dry conservancy, so far as it goes, removes some of the refuse with, say, less nuisance,—but unfortunately it does not go very far, for it leaves at least nineteen-twentieths of the refuse behind."

Then it is to be remembered that sewers can be rendered innocuous by disinfection; and Capt. Tulloch, says "for Madras, I have arranged that the sewers shall be throughout ventilated through charcoal disinfectors, a plan which is found to answer admirably in Europe." Capt. Tulloch next points out that the objections that have been urged against the sewerage system of Bombay and Calcutta do not refer to the sewers but simply to the place of outfall, that of Bombay being "the harbour for the benefit of the shipping," and that of Calcutta a great salt marsh.

And lastly he observes that both Dr. Thudichum and the Rev. H. Moule have repudiated the idea that they proposed to interfere with the proper working of the sewers; and he concludes:—

"If a thousand model latrines were to be built in Madras immediately, the state of the streets would not be in any way affected by them. Some of the most disgusting and filthy neighbourhoods in Madras are well furnished with privies. The drains would be as offensive as they now are, and the people would be burdened with the cost of an experimental system of conservancy which, by absorbing all their funds, would effectually put a stop to all works of real improvement."

We now proceed to the *Description of the Project*, and Capt. Tulloch furnishes us with the following outline of it.

"It is proposed to drain Madras from the south to the north—to separate the sewage from the rain-water—to carry the former by sewers of small capacity to *one* central spot, north of, but near, the Madras Railway, and in the neighbourhood of the village of Coorookoopett—to lift it there by steam pumps—and, according as Government may decide, either to discharge it by an outfall sewer into the sea at a point two miles north of the Railway, or to utilize it on some thousands of acres of waste land lying to the north-west of Madras."

Capt. Tulloch defers the consideration of the utilization of the sewage and first enters upon the question of where shall the outfall be? He very wisely dismisses the rivers and canals, for the simple reason that to drain Madras into them is merely to convert them into,—or rather to leave them as they are at present,—gigantic cess-pools. The sea then is the only outfall, but no sewage should be discharged near the town. Capt. Tulloch, like ourselves, lived long enough in Fort St. George to be able to say of the great sewer at the north east angle of the Fort which drains only a portion of Black Town —"No description can convey to the minds of those who have never lived within the influence of the smell from this sewer, its overpowering offensiveness when the outlet is open." It certainly is not pleasant to be awoke in the middle of the night by a frightful sense of suffocation, and a feeling as if there were something unpleasantly thick in the air, and then to have your olfactories assailed with a sickening stench, only to be got rid of by closing doors and windows, setting the punkah vigorously in action, and freely sprinkling the room with Condy's, or Norton's, or McDougall's fluid, with an after dash of Rimmel's Toilet vinegar. And it is equally unpleasant to have a little social gathering terminated by one's guests suddenly calling for eau-de-cologne, plunging their noses into their handkerchiefs and hastily ordering their carriages in order to drive away out of the range of the "dreadful smell." It is fortunate for the residents of the Fort that the "unfavourable winds" only blow for a few weeks in the year. Those who have suffered from this outfall sewer can sincerely pity their poor fellow-subjects who are compelled by circumstances to reside in such places as Anderson's Street and Stringer's Street in Black Town where the atmosphere inhaled is constantly impregnated with the same kind of effluvia only in a less concentrated form, and such persons can heartily enter into the spirit of any scheme which proposes to effectually abolish the nuisance.

Fully establishing the principle that no out-fall sewer should be permitted near the town, Capt. Tulloch next enquires;

"Shall the sewage be carried into the sea north, or south, of Madras?" In order to answer which the following points have to be considered:—

1. The physical features of the town. These are shown o be such that, although there is no natural line of drainage or Madras, considered as a whole, yet certain local circum-

stances establish the fact that the only course is to drain to the north.

2. The direction of the prevailing winds. The most frequently prevailing winds would carry the smell in either case out to sea. Those which would bring it into Madras, either from a northern or a southern outfall, blow each for about 80 days in the year, so that this can form no guide.

3. The sea currents. These are decidedly in favour of a northern outfall.

4. There are special advantages offered by a northern outfall. No engineering difficulties and therefore comparatively little expense. No opportunities for utilizing the sewage in the south, whilst in the north, there are upwards of 20,000 acres of waste ground situated on the most favourable level possible, and in the directions from which the wind blows least often during the year.

How far north should the sewage be discharged? For the present Captain Tulloch has arranged to discharge it at a point two miles north of the Railway station. But ultimately it may be carried to a point three, or even four miles to the north, the question being one of expense only, as no engineering difficulties exist.

The next question is, will any lifting apparatus be required, or can Madras be drained by simple gravitation? The levels are such that in order to give the proper slopes to the sewers the sewage must first be conveyed to a particular point and then pumped up to the entrance of the outfall sewer. The situation of the pumping apparatus is an engineering question merely, and in the project it is proposed to raise the sewage near the lands on which it is contemplated to use it, and where the prevailing winds will not convey the smell into the town. The next point is one which embraces a very important consideration, viz. whether the same system of sewers shall carry off both rain-water and sewage as in England. Capt. Tulloch enters deeply into this question and satisfactorily shows that so exceptional is the rain-fall of Madras as compared with that of England, that if the sewers are to be adapted to carry away both rainfall and sewage, they will have to be constructed of a discharging capacity four times that of the sewers of London, for the same area to be drained.

"In 1851, the south-west monsoon came down with a tremendous burst—11·45 inches fell in 5 hours. Thus—2¾ inches in the first

hour—2 inches in the next hour—nearly 3½ inches in the next—1¾ inch in the next—and 1¼ in the last. No underground sewers could stand against such a body of water as would flow into them at one of these outbursts of the monsoon. And these extraordinary falls seem to occur at intervals of about 8 or 10 years. I am given to understand that the main sewer of Calcutta is as much as 30 feet wide. While Madras remains poor as she is, it will be folly to attempt the construction of sewers on such a scale.

"It will naturally be asked, 'If the sewers are not to carry away the rain water, how is it to be got rid of?' The answer is—by open channels. I propose, however, at first, to make use of the existing large drains as the outlets for storms. This will, no doubt, cause surprise to many, considering how much the present drains have been abused. It is well known, in drainage engineering, that when the quantity of water is great, the form of the sewer is of little consequence. Whether it has a rectangular section or an oval section, the velocity is still sufficient for all possible purposes. Now, the section of the Madras drains is certainly very far from faultless. Nevertheless for storm waters they will answer admirably. When Madras can better afford it, it will be time to reconstruct these channels, but having them now at hand, I am decidedly of opinion that they should be used. The drains which I propose to keep are not, of course, the open *street* drains in all parts of Madras, but the few large underground and open channels which discharge immediately into the sea, the Cooum, or the Canal. All the street drains should be taken up, for the bricks of which they are constructed are of the worst possible kind and so saturated with liquid filth, that every effort to cleanse the town without the removal of these drains will be ineffectual. At present, all that would be necessary would be to re-place these drains with broken granite, down which the rain water would flow until it ultimately entered, as it now does, one of the large outlet drains. The Municipal Commissioners, who spend yearly about 20,000 Rupees in new drains, would have that sum available for this work, inasmuch as no new drains would be required in the town if this project were carried out. Ultimately it might become necessary to have open channels of stone set in mortar, similar to those in use in England."

Capt. Tulloch next gives a description of the course to be taken by each sewer, and branch sewer, and the outfall sewer; the dimensions, slope, means of cleansing, ventilating, flushing, &c. We will not follow our author here, we have unbounded faith in his engineering skill and believe that he has given such deep consideration to the subject as to enable him to plan a most effectual system of sewers. The pumping station is to be placed a little to the north of the Railway, and north-west of the Mint. It is not intended to have

a large reservoir for ponding up the sewage for many hours. There will be a small well of, perhaps, 8 or 10 feet in diameter, into which the sewage will be led for conveniences of pumping. During those hours of the day when there is little or no sewage to be raised, the engines will be stopped and the sewage will be allowed to accumulate in the main sewer, which, in fact, will be the ponding reservoir, and take the place of those enormous cisterns which are constructed in Europe. The sewage is to be lifted by steam pumps to a distance of 10 feet above datum line and then discharged into the outfall sewer. And as the main sewer will terminate at a depth of about 16 feet below datum line, the average lift will be about 26 feet.

The street drainage is to be effected by means of 9 inch and 6 inch earthenware pipes of English manufacture, with means of flushing and access to the pipes at intervals of about 300 feet.

The very important matter of house-drainage is next noticed, and here we must again quote from the Report.

"The house drainage will be effected by three and four-inch earthenware pipes laid at as great an inclination in each instance as the internal arrangements of the walls and rooms of the dwelling will admit of. The pipes will start from the back yard of the house and will issue into the street from under the front door of the dwelling. The admirable system known as "back drainage" in England cannot be adopted in Madras. The destruction of property would be so great as to put it entirely out of the question. In London, where there is generally an open yard at the back of every house, there is no difficulty in draining the houses to the rear—in fact, it is cheaper to do so, but in Madras the back-yard to the house is surrounded by small buildings, the destruction of which would be necessary before a pipe could be laid. Every house, moreover, invariably slopes, and some very considerably, *from* the back-yard *towards* the street. To attempt "back drainage" will be to drain the houses against the natural slope of the ground. Many objections may be found and urged against carrying the pipe through the entire length of each man's dwelling and taking it into the street, but long attention to this subject and a careful inspection of numerous dwellings all over the town, have convinced me that this is the only method at our disposal. It is not possible to make use of the present house drains, which are usually channels of about 4 inches square, and run beneath the wall which separates two contiguous buildings, and is common to both. These drains having been built along with the houses, there is no means of getting at them except by pulling down the walls, which cannot be done without causing damage to

the dwellings. In many of the streets, the slopes which have been given to these channels are very slight, and they constantly become choked up in consequence.

"I considered at one time whether it would not be possible to dispense with new house drains altogether, and to use the present channels although they are so defective. But I found, if this were attempted, that the dimensions of the main and branch sewers would have to be enormously increased, and at least six times the amount of pumping power already recommended would have to be provided."

Capt. Tulloch here enters into the consideration of the quantity of ordinary and of extraordinary rain-fall which would enter the sewers if the present house drains were used, and for the discharge of which provision would have to be made. And he then continues :—

"All these considerations have led me to the conclusion that in Madras, where the conditions of rainfall are different to those in England, it would be advisable to effect a perfect separation between rain water and sewage. I would, therefore, leave the present house drains as the discharging channels for rain water, and would lay down three and four-inch earthenware pipes in the manner already proposed in page 102 for the sewage. In every yard, or wherever water may be used within a native dwelling, there would be a small cistern fitted up with a sink. The earthenware pipe, which would run from the back to the front of the house, would, in most cases, pass directly under these sinks and be connected with them by syphon traps.

"To illustrate my meaning, I will take the most ordinary case—a native dwelling with, say, three open yards, one behind the other, and with a well in the back, and another in the front yard. The earthenware pipe would start from near the well in the back yard, and thence pass through the dwelling and out under the front door. It would join the street drain in the middle of the street. Round each well it would be necessary to put up a brick dam two or three inches high—just sufficiently high to intercept the water, and sufficiently far from the parapet of the well to admit of the inmates of the dwelling bathing and cleaning their pots in the space between the parapet and the dam. A sink would be fixed in this open space so that all the water that was used at the well would escape through the sink and pass at once into the earthenware pipe. In many cases the dam would not be required, for there is already a channel from each well, and the sink might at once be fixed in it. Care should be taken not to lay it at the lowest point in the open yard, as, in that case, the rain falling on the roofs of the houses and in the yard would enter the earthenware pipe.

"The house drainage should be carried out under the immediate direction of the Municipal Commissioners. Every house-owner should be at liberty to lay down the drains in his house himself, subject to the approval of the work by the Commissioners, or, if he preferred it, the Commissioners should lay down the drains for him at their own cost, and increase the rate charged on the house by such a sum as in 30 years would amount to the value of the work done with interest thereon."

As to the disposal of the sewage, Capt. Tulloch intends that the connection at present between the privy drain and the house drain shall be stopped, and the former joined to the new earthenware pipe through which all the urine will escape to the sewers. And as to the ordure, he says:—

"I would encourage, as much as possible, the system which obtains at present throughout the town, but I would, at the same time, try to improve it. The abominable smells in all parts of Madras are not produced, as is generally supposed, by the excreta of the population, but by defective drainage. It is the *refuse water* in the houses and in the streets into which all manner of garbage is thrown to ferment and generate foul gases, that creates the dreadful nuisances so much complained of."

And he proceeds to say that all that is required is a proper and constant supervision of the privies, for which he calculates that an establishment costing about Rs. 5,000 per annum would be sufficient. But he adds:—

"The best system for the removal of excreta is the sewer system—provided that plenty of water can be employed to carry away the urine and ordure, and that a liberal use can be made of some deodorizing solution to prevent effluvia. There is nothing equal to the water-closet for cleanliness and wholesomeness. It acts perfectly if deodorizers are used as well as water. Both deodorizing and antiseptic solutions will, before long, be procurable at prices that will admit of their free use even by householders, but many years must elapse before every house in Madras is supplied with water. Until then, I am satisfied, that it will be best to continue the present system."

The subject of the utilization of the Madras sewage is next entered upon and strongly advocated. Capt. Tulloch has selected a spot of ground of which he gives a map with an ingenious diagram, showing that it is most favourably situated for the purpose, as it would be under the influence of winds which would carry any smell to the town, for only a few days in the year. He says, that every town in India has an interest in the decision of this important question,

and could it be proved that the sewage of towns could be profitably and safely applied to land in India, an incalculable benefit would be conferred on the whole country. The great advantage of using the sewage in the way proposed in the Project would be the saving of the expense of the outfall sewer which will cost about three lacs of Rupees. Besides this, the value of the sewage would soon become evident, when its sale might be effected and realize a considerable sum.

The Report concludes with the cost of the Project, the total estimate for all the works being as follows :—

	Rs.
Main Drainage..	18,74,047
Street Drainage..	9,42,613
Land to be purchased	25,340
Buildings do	20,000
Engines and Pumps of 72 horse power at Rs. 1,500 per horse power	1,08,000
Pumping Station, including cost of putting up machinery and other works	70,000
Total Rupees......	30,40,000
Add about 10 per cent. for Sundries and Contingencies..	3,10,000
Total Rupees......	33,50,000

If Government decide to utilize the sewage, the outfall sewer will not be required, but an irrigation sewer costing about a lac of Rupees will have to be built. Thus the total cost will be 31½ lacs.

The annual cost for superintendence will be about Rupees 9,792 which capitalized at 5 per cent. would represent a sum of about 2 lacs.

Fuel, oil, &c., would cost annually about 13,000 Rupees, representing a capital of about 2¾ lacs.

Repairs will be fully met by ½ per cent. on the cost of the works, say 16,000 Rupees annually, or a capital of 3¼ lacs. Our author says :—

"I will even assume now that the works may cost as much as 50 lacs or half a million pounds sterling. And what will the rate-

payers receive for this sum? All liquid refuse will be removed from the precincts of their dwellings and will be utilized on the land."

And he, of course, takes the opportunity of contrasting this with his estimate of the cost of dry conservancy by which only urine and ordure are removed, which together amount to *one hundredth* part of the sewage.

We have quoted thus freely from Capt. Tulloch's report, partly in order that our readers may have a correct notion of his project, and partly in order that they may have an opportunity of judging of the fairness of the remarks which we have to make thereon.

We quite agree with Capt. Tulloch as to the advantage of properly constructed sewers, we believe it entirely impracticable to apply dry-earth conservancy to Madras, or to any other large town, even if the system were not open to the objection that it leaves the greater part of the sewage unremoved. The Rev. H. Moule is enthusiastic upon the subject, and has even invented an earth-closet for the universal application of his system. The writer in the *Quarterly Journal of Science* before alluded to says :—

" The 'earth-closet' system, as advocated by the Rev. H. Moule, of Dorchester, is scientifically well-nigh as thorough-going as the system of purification by fire. It is even less amenable to objection on the score of offensiveness; but we fear that considerations of expense, as well as the mechanical ones of difficult conveyance and transport, will restrict the sphere of its application to certain public institutions, and render its adoption impossible, at least to any great extent, in private dwelling-houses.

"The ordinary Englishman has an extraordinary horror of domiciliary visitations, and especially does he abhor them when they are of the kind which this system postulates. The economist knows that suspension in water is a cheaper, as the least economical of men knows it is a less offensive, mode of carriage than any modification or adaptation of the scavenger's cart. And, finally, the agricultural chemist thinks, indeed, that earth is the true medium for the deodorization and utilization of sewage, but he thinks also that the true way of acting upon this conviction is to bring the sewage to the soil in the irrigated meadow, not the soil to the sewage in the earth-closet."

We can endorse Capt. Tulloch's statement that the dry-earth system as we have seen it applied is not perfectly inodorous, but only less offensive than other modes of dealing with excrementitious matters. Our experience is to the

effect that nothing short of constant supervision by Europeans will ensure this system being carried out as recommended by its originators. And unless persons can be found who will so appreciate the utility of the so-called "poudrette," as to induce them to purchase it, or even merely to remove it and to supply earth free of charge,—which is not the case in Madras at present,—there can be no doubt of the great costliness of this system. So far as Barracks, Hospitals, Jails, and large Schools, where efficient supervision is readily attainable, are concerned, the dry-earth conservancy will probably be found to be the least offensive and the most innocuous of all systems of removal of excrementitious matters hitherto pursued in this country, and its expensiveness and cumbersomeness may be of no great import in such establishments. But as Capt. Tulloch points out, it cannot supercede drains;—the liquid sewage must be carried away. We consider that, taken into consideration with the utilization of sewage, the dry system must yield the palm to that in which excreta are removed by suspension in water. As regards Madras, it must be remembered that the works for the water supply have actually been commenced, and that in process of time we shall have an abundant supply, so that it is no longer relevant to ask "where is the water to come from?"

It is in respect of the way in which ordure is proposed to be dealt with that we consider that the project before us is chiefly defective. We see no reason why the solid excreta, as well as the urine, should not pass into the house-pipes and so on to the sewers. Capt. Tulloch seems to overlook the fact that by proposing the continuance of the present conservancy arrangements, so far as the removal of solids is concerned, he scarcely relieves the municipal funds of any portion of the present outlay. The same number of carts and a great portion of "the army of toties," will still have to be employed.

Besides this, we question whether Capt. Tulloch is right in his opinion that the removal of excreta to a distance is universal in Madras. Our duties for several years necessitated our paying early daily visits to Black Town, and with this result, that we look upon the open drains as common privies. One must speak plain when dealing with such a subject as sewage and especially with such a dirty town as Madras. We have seen the open street

drains being made the receptacles of ordure, not only by hundreds of children but also by adults; and that the house drains are similarly used is plain, for unmistakable fæcal sewage may be seen dragging its slimy course from the mouths of the house drains (generally a foot or two higher than the street level) into the street drains below. We are not mistaken on this point; "seeing is believing." And yet Capt. Tulloch proposes to leave these house drains, merely cutting off their connection with the privy, and to take up the street drains, and supply their place with broken granite, so as to afford channels for rain-fall. What security has he that these drains will not then be used for the same purposes as now? and then what should be merely storm water will in reality be liquid sewage.

There is in India at the moment we are writing, a large-minded, and what is commonly called a large-hearted, lady, Miss Carpenter, who has made her way to Hindustan on a Female Education Mission. We had the pleasure of conducting this lady through the wards of the General Hospital and were struck by her keen-sighted observation. She has lately addressed a large meeting in Calcutta on the subject of Social Science, and we quote the following from a newspaper report of her speech :—

"Another highly important subject was the popular health and mortality as affected by insufficient drainage and conservancy; particularly in cities. She could not say whether this was as painfully apparent to residents as to strangers. She was glad to know that much was done to check this deadly evil, in Calcutta and elsewhere; but all this experience was precious, and should find record. If the disgusting and poisonous malaria of that part of Madras known as Black Town—and she could hardly speak better of the open drains of Calcutta—were overcome, as it must be in time, the struggle and the victory ought to be history, and be treasured in the volumes of the Social Science Association. Scientific persons will, of course, discuss these things, and the important practical wisdom thus elicited was too precious to be lost."

From a conversation we had with this lady, we know that she is herself in favour of dry-conservancy, but she acknowledged that her experience was almost confined to her own establishment. We agree with her that the disgusting and poisonous malaria of Madras must be overcome *in time,* and, in the interests of our common humanity, we trust that that time is at hand. It is possible that our small utterings may be of little avail in hastening on that time,

but as our editorial duties have caused us to enter upon this subject, the utterings must be made.

Given the acknowledged disgusting and unsanitary condition of Madras, traced to its causes, defective conservancy and—we must speak out—dirty, negligent habits, and apathy born of ignorance; what are the remedies?

I. It appears to us that no conservancy arrangements can be effectual without a primary alteration in the habits of the people, and that such alteration can only be secured by a stringent law, rendering the committal of nuisances punishable summarily. There may be some such law existing, for what we know, but if so, it is a dead letter. We do not mean that offenders are not punished on conviction—for we know that persons have been fined *eight annas* each for polluting the Cooum as it runs between the grounds of the General Hospital, and the Body Guard riding school. But what we affirm is, that there is no detective influence at work. We would have rules printed in the vernaculars, posted and freely distributed, and we would also tom-tom the same about the streets and insist on their being complied with.

II. To provide for detection, an efficient staff of Supervisors is needed. What is everybody's business is nobody's business, and to trust to the present Native Police, would be to lean on a bruised reed, for it must be notorious to every one not affected with obliquity of vision that the Police peons are generally great sinners in this respect and look upon the street drains as public urinaries. The labours of such supervisors would, for some time, be arduous. They need begin with the earliest streak of dawn, and though the mid-day's glare might give them some respite, yet as the shades of evening close in, again must they be on the alert.

III. A stringent law and an efficient supervision being provided, we would take care that no open drains existed to afford a temptation to break the law or elude the supervision. In this matter we differ from Capt. Tulloch. We have far too great a respect for his professional talents to presume to differ from him on a point of engineering. So we fully accept his dictum as to the exceptional rain-fall of Madras rendering separate means of its removal necessary. But to guard against the rain-fall drains becoming sewers, we would cut off the connection of the present house drains with the privies, and commencing in the back-

yard, we would re-place the open gulleys with pipe drains, and, giving them a good slope, let them terminate in the street drains. These too we would have closed, and of course, furnished with properly-trapped apertures for the entrance of storm water. We see no reason why there should not be *superficial* closed drains of capacity sufficient to carry off the storm water, as well as deep sewers. We know that it is objected that closed drains get clogged or choked, and that back draughts of foul air may take place. These are matters entirely under the controul of engineering skill, and we have no hesitation in saying that, as regards recently constructed drains, the objections no longer exist. Besides the drains we would have, should not be receptacles for any putrescent matters whatever.

IV. The removal of rain-water being provided for, the sewage must next be considered. And here we have but little to say beyond accepting Capt. Tulloch's project so far as the sewers are concerned. We have already given our reasons for so far departing from his project as to admit solid excreta into the sewers. In order to effect this, we would at once "go in for" water-closets. We know that Capt. Tulloch will agree with us; we have given a quotation from his report which proves this. The only difference between us is as to time. He thinks water-closets will ultimately come into use; we would at once introduce them and enforce their use. Before further remark, we must quote again from the *Quarterly Journal of Science*:—

"The water-closet system for the removal of excreta comes lastly under consideration—a system which, though of recent date, and, out of this country at least, of comparatively limited development, is yet in a fair way towards establishing itself ineradically in the domestic arrangements of the upper classes of civilized nations. Its economical merits rest on the engineering axiom 'Carriage by suspension in water is the cheapest mode of transport'; and its merits on the score of inoffensiveness need no further exposition than a certain country will furnish, in which the water-closet is even now something of a novelty, and known even yet by the name of '*Cabinet Anglais.*' Its demerits are—first, in an agriculturist's eyes, the exceeding dilution to which it subjects manurial matters at all times, and most especially at times when the country is already saturated with rain-fall; and, secondly, from the sanitarian's stand-point, the great liability to derangement under which it labours at times of severe frost in wealthy, and at all times in poorer houses. Of the agricultural difficulty, Mr. Menzies offers

one solution [the separation of rain-fall from sewage as Captain Tulloch purposes], and to this subject we shall recur, addressing ourselves in the meantime to the Hygienic aspect of the system. And it must be confessed that here, as elsewhere, the old proverb holds good, '*Corruptio optimi pessima.*' All efficient, innocuous, and inoffensive as is the in-doors water closet if properly fitted up, it may be made as noisome as, and assuredly will be more noxious than, the old-fashioned out-door retreats, if it be not so fitted up. The precautions to be taken relate, first, to the lighting and ventilation of the room itself; secondly, to the ventilation and trapping of its outlet-pipes; and, thirdly, to the communications which these discharge-pipes are allowed to set up with other waste-pipes. These precautions we will give in the words of Mr. Rawlinson in his paper of 'Instructions and Suggestions to Local surveyors with respect to Main-sewers, Drains, and Water-works.' 'House drains,' says Mr. Rawlinson, 'sink-pipes and soil-pipes, should have means of external ventilation. Down-spouts may be used for ventilation, care being taken that the head of such spout is not near a window. In-lets to all pipe-drains should be properly protected. Water-closets, if fixed within houses and having no means of direct day-light and external air ventilation, are liable to become nuisances, and may be injurious to health. Water-closets should have a day-light window, not a 'borrowed-light' and fixed means of ventilation which can neither be seen nor tampered with. Permanent openings, equal to a slit twelve inches in length and one inch wide, should be provided.

"If these rules and regulations are disobeyed, the house of the richest man in the country may be made, as we know such houses have not rarely been made, as fertile of fever as the most wretched of our town or even of our village alleys. . . . .

"If the water-closet system is fraught with such dangers to those who, *ex hypothesi*, have the power of taking care of themselves, it may seem rash to recommend its introduction among the lower grades of society. But, just as we would recommend the retention (which, indeed, needs no such recommendation) of this system amongst the upper classes, but should imperatively urge the adoption in all cases of the precautions above specified, so, for the poorer part of our population, we believe that the water-closet system, at all events under that particular modification of the ordinary arrangement known as the 'Latrine,' is, after all, the best also. For full details and figures of the different forms of latrine, we refer to the excellent 'Report of the Commission for the Improvement of Barracks and Hospitals,' at page 87;* but the general statement of the relative merits of the latrine and the water-closet which the Commissioners give we will herewith quote:

* See also Clark's Hygiene of the Army in India, p. 107.—Ed.

—'Water latrines,' they say, 'are preferable to soil-pans,' *i. e.* water-closets 'because they are not open to the same objections. They can be made to consume a very small amount of water; they cannot be injured by any ordinary force; they are simple in construction, require very little repair, and are easily kept clean. There are various forms of these latrines in use, but the principle of construction is the same in all. It consists of placing a water-trough under the seating, which is filled to a certain depth with water, and discharged into the sewer or drain once a day at least. The whole process is simple and efficient, is attended with very little nuisance, and is perfectly innocuous to health. The different forms of latrine vary in construction and in adaptation to their object.' The introduction of this modification of the water-closet system into our overcrowded alleys would be a boon indeed, and its machinery in all its varieties, is, or can be made, so simple that it is less liable to derangement, and consequent pestiferousness, than almost any other structure intended for the same purpose."

The agricultural objection to the water-system could not be advanced as regards the thirsty-land of India, more especially with respect to Captain Tulloch's project, as he excludes the rain-fall from his sewers. The hygienic objections we believe also would be *nil,* if the water-latrines are introduced.

We would first introduce these water-latrines into the public latrines of Madras. Captain Tulloch tells us it would be easy to design them so as to admit of natives sitting in their accustomed attitude. If Captain Tulloch's scheme is accepted, it is probable that he may be required to proceed to England to arrange for pumping engines, &c., and to enable him to design pumping station works, and, if so, a portion of his time might be well spent, as concerns the welfare not only of Madras, but, as we think, of every large town in India, in consulting with water-latrine manufacturers as to the modifications which would be required. Mr. Stewart Clark has shown that these machines may be easily adapted to hold and serve a sufficiency of deodorant or disinfectant to render them in themselves perfectly innocuous; and as, of course, their contents must flow into the sewers, by communication of their outlets with the house or street-pipe drains, the advantage of a general disinfection of the sewage might thus be gained. Another advantage which these water-latrines possess is convenience for ablution, the want of which is the great bug-bear in the application of the dry-earth system to latrines for natives. We do not doubt that these water-latrines would soon come into general use. And

we do not doubt also that our views on this subject will be scorned and ridiculed as chimerical and not in accordance with science and the prejudices of the natives. But we read "the signs of the times" differently, and believe that our native fellow-subjects are as open to conviction and as amenable to reason as we are ourselves, perhaps more so than are our poorer compatriots. And with reference to the introduction of this system among the poor, Mr. Rawlinson tells us that it is possible to have a town, such as Alnwick, so "completely water-closeted" that "the very beggars' common lodging houses have water-closets or soil-pans." It must be borne in mind that we are speaking of Madras with, not without, an ample water-supply.

V. We would utilize the sewage. Something must be granted to Capt. Tulloch's skill and all the thought he has given to this matter, and we think that no spot of land could apparently be better suited for the initation of the experiment, in or about Madras, than that which he has selected.

We are anxious to entertain every objection that can be offered to what we have advanced, but facts are stubborn things, and there can be no denial of the success of the experiment of irrigating lands with sewage in England. It may be urged that by following our suggestion of letting the solid excreta be mixed with the liquid sewage the lifting pumps might become choked, or the heating qualities of the sewage be found too great for the crops. We have not the slightest fear that either of these events would happen. But if the free working of the lift-pumps should be interfered with, a proper system of filtration of the sewage before it reached the pumps would be all that would be needed. Or should the pumps work well and still the solids of the sewage act injuriously on the crops, the writer in the *Quarterly Journal of Science* affords the following solution of the difficulty :—

"As it seems to us, then, upon the evidence before us, any town corporation which could command an acre or so of the lightest and poorest land for the reception in open grips and by gravitation of the sewage of from every fifty to every hundred of its inhabitants, might safely count upon a handsome return, in reduction of their local rates, from the sale of the grass crops, they would thus and there raise. But it appears that all these conditions must be present if a pecuniary profit is to be secured, besides, and beyond the great negative saving, which all such disposal of sewage effects, in the

way of prevention of disease. When guano has become scarcer, and the farmer more enlightened, it will be otherwise; but in the meanwhile, it is easy to see that, in many cases, no adequate supply of land may be cheaply available, or that such as may be so, and may have the sandy or loamy constitution which fits it for irrigatory purposes, may yet be situated as to stand in need of an expensive lifting and pumping apparatus; or, finally, that the only available area may be an impermeable clay, and thus be physically unfit for the duties which its chemical character would excellently qualify it for. The observation of the great comparative purity of the water which flows out of the thick felt which the American weed forms now in so many of our ditches and sluggish streams, has suggested to us that, in such unfortunate cases as those we have just specified, arrangements might be made for sending the sewage of towns through a network of ditches filled with this vegetable filter. The growing vegetation, besides setting free into the foul water an abundance of purifying oxygen, would build up into its own substance a quantity of valuable manurial salts, which would make it, worth the farmer's while to dredge it up and plough it into his land. The positive return from such a harvest as this would be small indeed as compared with that of the Italian or other grass from the meadow, which, in such cases, is unattainable, *ex hypothesi.* Still, such a plan, if not positively profitable, would at least be negatively so, by destroying the mischievous and morbific properties of the sewage it dealt with; and thus, as, with the exception of vice, nothing is so expensive as disease, it would effect a real economy."

We have already said that we do not anticipate any need for the execution of such a plan as this. But should it be found necessary, we believe that the sewage thus deprived of its solids would produce ample crops or grass upon the irrigated lands, especially if the effects be supplemented by ploughing into the ground the vegetable matters which may be used as a filtering medium. Such a system of filtering ditches as is suggested in the above extract would not entail any offensiveness, as the sewage would be deodorized at its source.

It cannot be too often or too strongly insisted upon that the success of such a system of sewerage with utilization of the sewage, in Madras, would not be merely a sanitary triumph for this city, but a victory for India in general, or, to use Captain Tulloch's words, "an incalculable benefit would be conferred on the whole country." For what is possible in this respect for Madras is possible in every inland town. Mr. Clark tells us:—" There are very few stations

that could not be drained; I never saw one; drainage is simply a matter of expense, more or less difficult under certain circumstances, of course, but probably always possible. Stations that cannot be thoroughly drained, if any exist, should be at once abandoned."

There is another point, besides the mode of removal of solid excreta, in which we do not quite agree with Capt. Tulloch, viz., in his proposition that the cost of putting down the house drains shall fall upon the house-owners. We know that this is the English plan, but to quote Capt. Tulloch: "The mistake lies in arguing from England to India without considering the different conditions prevailing in the two countries." By far the greater number of house-owners in this country are the house occupiers, and, even if this is not the case in Black Town, yet the owners are not the wealthy people which English landlords generally are. We do not hesitate to say that to insist upon the house-owners directly paying for putting down the new house drains would be to raise the greatest possible impediment to carrying out an efficient system of drainage. We consider that the cost of the house drains should be added to that of the other works connected with the system, the interest upon the first cost of which should be recovered by a general sewer rate. Of course, we are not in a position to say what the increase upon Capt. Tulloch's 36½ lacs would be, but we may make a rough calculation from data afforded by Capt. Tulloch. He tells us there are 32,610 houses in Madras, and we may suppose that on the average each house drain will be 45 feet long. This will give us 1,467,450 running feet, which at one Rupee per running foot (Capt. Tulloch's estimate for 6 inch pipe, is Rs. 1-4 per running foot) would be, say, 14½ lacs of Rupees.

Then we consider the sewer system would not be complete without relaying the present house drains, this would cost probably other eight or nine lacs. And we think also that the present open street drains must be converted into proper covered channels for storm water; and this would cost perhaps other seven or eight lacs. Further, we would put up two water latrines for six persons each in the 100 existing public latrines. We do not doubt that Capt. Tulloch could devise efficient machines of this kind which could be manufactured at a very moderate cost; but the only information that we have is that McFarlane's latrines with

deodorizing apparatus may be supplied at such a place as Agra* at 350 Rupees each, say at 300 Rupees in Madras. This would add to the cost of the scheme other 60,000 Rs.

Again, we have no evidence in Capt. Tulloch's report that he has taken into consideration the existence of numerous parcherries and hamlets in and about Madras, consisting chiefly of shanties or huts, the unsavouriness and pestilence-producing qualities of which absolutely demand attention; so that probably something must be added for drains for these places.

Captain Tulloch's estimate for his project is 36½ lacs, but we say that this sum must at least be doubled before Madras can be made "a model of cleanliness." All Engineers tell us that drainage is simply a matter of expense, and that cheap sewers are a delusion and a snare, but that the sewer system is the cheapest mode of conservancy. All sanitarians tell us that to establish effectual drainage is to diminish the generation of miasmatic diseases, and to mitigate the severity of such as are inevitable,—to convert weak and delicate into strong and lusty citizens,—in short, to preserve health and to prolong life. And does not the end justify the expense? Even should the effectual drainage of Madras cost a million of pounds sterling, would not the money be well laid out? We believe that Captain Tulloch's project, with some such modifications as we have hinted at, would secure effectual drainage, and thus be a blessing not merely for the present generation but for many generations to come; and, therefore, the scheme might fairly be carried out by means of a loan to be gradually liquidated in the course of a fixed term of years. But this last is a question which does not come within our province to consider.

We cannot better conclude our notice than in the words of the writer to whom we are already so much indebted :—

"Of the ultimate triumph of the Sanitarian creed, we will say, in conclusion, we entertain not the slighest doubt. Unbelivers will be converted and nuisances reformed; our houses will be made wholesome, our streets inoffensive and our rivers pure. The strength of those who work, whether by head or with hand, will be less encroached upon by debility and depression; and the sum total of our years, and even of our happiness and enjoyments, will be increased perceptibly."

* Clark's Hygiene of the Army in India, page 130.

Dr. J. Moore Neligan's Practical Treatise on Diseases of the Skin. Second Edition, Revised and Enlarged. By T. W. Belcher, M.A., M.D. Dub.; B.M., M.A., Oxon; Fellow, Censor, Examiner in Materia Medica and Medical Jurisprudence, and in Arts, and Hon. Librarian, King's and Queen's College of Physicians in Ireland, &c. Dublin: Fannin and Co., 1866. flscp. 8vo. pp. 526.

Skin Diseases; their Description, Pathology, Diagnosis, and Treatment. With a Copious Formulary. By Tilbury Fox, M.D. Lond., Senior Physician to St. John's Hospital for Skin Diseases, &c. &c. London: Robert Hardwicke, 1864. 8vo. pp. 315.

The Action of Fungi in the Production of Disease. By Tilbury Fox, M.D. Lond., M.R.C.P., 1866. Pamphlet. Re-printed from the Edinburgh Medical Journal for April 1866.

A Practical and Theoretical Treatise on the Diseases of the Skin. By George Nayler, F.R.C.S. Assistant-Surgeon to the Hospital for Diseases of the Skin, Bridge St. Blackfriars. London: Churchill and Sons, 1866. pp. 292.

There is always some little difficulty in dealing with works on Diseases of the Skin, owing to the fact that almost every Dermatologist has his own views as regards classification. The artificial system adopted by Willan held its sway for many years, but the many objections which can be brought against all systems of classification which are purely artificial have led to various endeavours to establish a natural system. Among others, Mr. Erasmus Wilson, the late Dr. Buchanan of Glasgow, Professor Hebra, M. Hardy and Dr. Tilbury Fox may be mentioned as worthy labourers in this field. But medicine is not an exact science, and so long as this is the case it may be affirmed that a truly natural and pathological classification of skin diseases is impracticable. The difficulties to be overcome are considerable, for what

may appear to be a natural arrangement to one observer, will not satisfy another; the same evidence will produce a different influence on different minds. That the difficulties we speak of are real and not fanciful may be known from Mr. Erasmus Wilson's experience. At first his natural system had a trifid basis, anatomical, physiological and pathological; then he abandoned this for a mixed etiological and anatomical system; and lastly, this has yielded to a clinical arrangement, natural partly as regards the diseases themselves, and partly as to the anatomical connection of the structures affected.

Another difficulty which the uninitiated experience in handling treatises on Skin Diseases is the want of exactitude and uniformity in the nomenclature. For sometimes we find not merely specific but also generic terms applied to different diseases by different authors. We know that the subject of skin diseases is very frequently ignored in systematic courses of lectures on medicine, the teacher looking upon the study of these affections as a legitimate speciality. We ourselves are opposed to all specialities in medicine, because we believe that it is perfectly possible for every medical man to be equally accomplished in all branches of his profession. However an opposition to speciality in practice does not of course imply a disbelief in the utility of special treatises, so we readily acknowledge that skin diseases may legitimately claim for themselves the dignity of an entire volume devoted to their consideration.

The first edition of Dr. Neligan's work is well known and has long held its place as a reliable and thoroughly practical guide to the diagnosis and treatment of diseases of the skin. But since its first appearance there have been made several important discoveries illustrating the pathology of these diseases, and Dr. Belcher has opportunely seized the occasion to edit a second edition of the work incorporating therein the most recent knowledge which has been attained on the subject. Dr. Neligan's introductory chapter affords a very good summary of the different systems of classification which have been proposed; and explains the author's reasons for adhering to Willan's arrangement, with some modifications. He divided skin diseases into ten primary groups:—1, Exanthemata; 2, Vesiculæ; 3, Pustulæ; 4, Papulæ; 5, Squamæ;

6, Hypertrophiæ; 7, Hæmorrhagiæ; 8, Maculæ; 9, Cancroïdes; 10, Dermatophytæ; adding two supplementary groups, Syphilides, and Diseases of the Appendages of the Skin.

The original work comprised in the group or order Exanthemata, the following diseases, Erythema, Erysipelas, Urticaria, and Roseola; and Dr. Belcher claims as an improvement the addition of Rubeola, Scarlatina, Variola and its allies. We do not agree with him; we are rather in accord with Mr. Plumbe who entirely omitted the Exanthemata from the list of skin diseases. However, as the eruptive phenomena of these fevers afford good illustrations of the anatomical structure of papules, vesicles, pustules, &c., a short notice of them, confined to this aspect, may usefully find a place in the introduction to a dermatological treatise. The cutaneous alteration in these affections is so entirely a matter of secondary importance that the diseases themselves are much more legitimately and satisfactorily treated of as properly belonging to the miasmatic order of zymotic diseases. But lest there should be any fear that the ghost of Willan might be disturbed if the term 'Exanthemata' were expunged from dermatology, we would compromise the matter by retaining the order, including therein only the genera erythema, urticaria and roseola.

We have already said that Dr. Neligan's is a reliable treatise, and there can be no doubt that this second edition has undergone considerable improvement at the hands of the Editor. It is no part of our intention to go through the work seriatim. We turn to the Hypertrophiæ and find that Dr. Belcher has much enlarged the account originally given of Elephantiasis, but still we are very much disappointed. To the practitioner in India the descriptions of both E. Græcorum and E. Arabum are meagre in the extreme. We before noticed a complaint of Dr. Fayrer of Calcutta, that it is rare to find a "reference in any of the standard works professing to treat exhaustively of their respective subjects, to the authority, practice or opinion of one Indian Surgeon"* And we now say that had Dr. Belcher referred to the *Indian Annals of Medical Science*,

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* By the way we observed in the *Medical Mirror* for September 1866, a very unfair notice, so far as Dr. Fayrer is concerned, of our reference to that gentleman's "Address in Surgery." "There are critics and—critics," and we

he would have found papers by Dr. Webb and Mr. Waring; —and in some of the early numbers of this journal (an opportunity of referring to which could have been afforded him by his publishers) he would have found papers by Mr. Day and Drs. vanSomeren and Montgomery, which would have enabled him, at least, to have given at second-hand a much fuller and more accurate description of both Leprosy and Elephantiasis proper.

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think it quite worth while to quote a portion of the notice we refer to, in order that our readers may see to what lengths some critics may go.

"We will quote a passage shortly from a very able surgical work, which we would recommend most respectfully to Mr. Fayrer's notice. Mr. Fayrer seems to consider that lithotomy is a branch of surgery in which Indian Surgeons are certainly equal to any and every other English or Continental Surgeon, whether dead or alive. He says, '*we count our operations by hundreds*; some of our graduates have cut as many men successfully for stone as the GREATEST LITHOTOMISTS EVER SAW' (!!!) Professor Fayrer is an adept in '*tall*' talk, as our Trans-Atlantic cousins say. We certainly regret that we missed the opportunity of seeing Professor Fayrer, when we were at Calcutta. Lecturing to half-castes, and to natives is evidently very elevating, but we scarcely think that any more elevation is required. Perhaps a few years sojourn in England would sober down Professor Fayrer's style, which, from the following extract, would appear to be decidedly in want of a little wholesome pruning:—' And I might refer to the names of O'Shaughnessy, Brett, Webb, Playfair, Naismith, Aitcheson, Partridge, Bailey and others, as of Surgeons who have had experience in this operation that SCARCELY the Frere Jacques, RAU or CHESELDEN EVER EXCEEDED.' Genius and modesty are often allied. We may have genius certainly among our Surgeons of 'Her Majesty's Indian Service,' as they love to write themselves, but we look in vain for modesty in *one* of them at any rate.

"How is it that we read the following in Mr. Henry Smith's able Lectures on the Surgery of the Rectum? 'Every now and then we meet with cases where a fistula not communicating with the gut may heal up. Such a case has recently occurred to me in the person of a cavalry officer . . . *who came home invalided from India, for the express purpose of having an operation for fistula performed.*' The Surgeons of India, though equal to Cheselden in lithotomy, evidently require a little rubbing up in the surgery of the rectum."

We have no intention of criticizing this critic. We merely say that had Dr. Fayrer been speaking of himself, which he was not, the remarks upon his want of modesty might have been merited. Dr. Fayrer afforded proof of his assertion as regards success in Lithotomy, 'Baboo Ram Narain within a period of 12 years, operated upwards of 200 times with a loss of 7 cases.' And as to numbers he gives a table in which it is shown that in the last six months of 1863 among the operations performed in 180 hospitals in Bengal, there were 623 lithotomies with 65 deaths, a mortality of 1 in 96 nearly. Smith of Bristol (Chelius, Vol. II., page 545) estimates the total number of stone operations in Great Britain at 200 annually! and Thompson (Practical Lithotomy, &c. page 76) says that out of 1,827 cases of lithotomy in English Hospitals, there were 229 deaths, or 1 in 7¼. Facts are stubborn things.

The term Medical Officers of "Her Majesty's Indian Service" was first used by Sir C. Wood in the Warrant dated India Office, 7th November 1864.

We are sure that Mr. Henry Smith never intended the extract from his Lectures to be used as it has been. Had the critic had an opportunity of

We observe that Dr. Belcher has availed himself of the recent researches into the nature of those affections of the skin and its appendages which are now known to be due to, or attended with, the presence of parasitic fungi. But although he preserves the original group of *Dermatophytæ*, he does not include in this all the parasitic affections. As regards *tinea (herpes circinatus)* he leaves it in its original place among the Vesiculæ, and, withholding his own opinion, he merely places in contrast the views of those observers whom he calls the "parasitic theorists" with those of Mr. Erasmus Wilson who calls the *trichophyton* granular or phytiform degeneration. Dr. Belcher's order *Dermatophytæ* comprises only *Porrigo* and *Sycosis*. But in the introduction to this section he just enumerates the "dermatozoa or ectozoa," amongst which he places the Dracunculus! For information respecting the guinea-worm disease, he refers to Mr. Bastian's paper in volume xxiv. of the *Transactions of the Linnæan Society,* and adds the following, which surely might have been left out of his pages without any loss being felt.

"The *treatment* of the guinea-worm disease consists in gently extricating the worm by winding it gradually on a piece of card, during which process, if the worm be broken, much inflammation and sloughing occurs."

We observe that Dr. Tilbury Fox also has a slight notice of this affection, but we are at a loss to conceive how by any stretch of the imagination the *Filaria medinensis* can be considered an ectozoon; or how the dracunculous affection can claim place upon the list of skin diseases, unless the bulla

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seeing Dr. Fayrer when he was in Calcutta, he might have learnt that it is possible for a Cavalry Officer with a fistula to be so shattered in health as to render an operation unadvisable at the time and a return to Europe absolutely necessary for the restoration of his health. The fact of his being *invalided* would indicate that he was sent home for some purpose quite independent of an operation for fistula; although he might himself be under the impression that the local disease was his only ailment and that he was invalided specially to have it cured.

We admire the honest and logical conclusion that, because a Cavalry Officer was invalided with a fistula, the whole Indian Medical Service requires "a little rubbing up in the Surgery of the rectum."

We presume the Editor of the *Medical Mirror* must have overlooked this specimen of "independent medical opinion," for he surely would have sacrificed the "smartness" of his contributor rather than have allowed his pages to be sullied by a gratuitous insult to a large body of his Medical brethren.

which is formed when the filaria endeavours to extrude itself gives it such a claim.

The peculiar feature of Dr. Neligan's work is the great variety of prescriptions therein introduced, and the fulness of the directions for treatment given for each disease. In addition, the work concludes with a chapter on General Therapeutics of skin affections which, with the exception of a few judicious interpolations on the part of Dr. Belcher, stands much as it did in the first edition.

Dr. Belcher says:—

"The system of writing names and quantities in Latin and the directions in English he (the editor) entirely disapproves of, on the grounds that, irrespective of its being unworthy of an educated man, it is a sop thrown to ignorance, and that by encouraging ignorance in a learned profession it directly tends to promote the evils which the writing of directions in English is intended to prevent."

We totally disagree with Dr. Belcher. We do not think that writing directions in English is any proof that the writer is ignorant, any more than that a compulsory use of Latin in writing such directions would insure that the writer possessed a "scholarship above reproach." As the vast majority of the dispensers of prescriptions are not members of a learned profession, we consider that the interests of the patient as concerns directions for use are best consulted by employing that tongue with which both themselves and the dispensers are most familiar.

The work of Dr. Tilbury Fox is one of high excellence and is evidently the production of an accomplished pathologist. The author tells us in his preface:—

"My chief aim has been condensation; consequently mode or style has been almost entirely sacrificed to matter; secondly, general principles of treatment rather than empirical data have been indicated; and thirdly, especial prominence has been given to the diagnosis of the various diseases. My own peculiar views have been obtruded as little as possible on the present occasion; while the views of others, especially those of the leading French and German authorities, have been fairly stated.

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"Skin diseases, strictly speaking, cannot be taught; they must be learnt clinically. Plates and books are worse than useless if the descriptions they portray be not made subservient to, and constantly and critically compared with, actual disease.

"I will only add a hope that soon the dermatological may take its legitimate rank in our medical schools, besides the obstetric, ophthalmic, aural, and dental departments, and not be deserted as a speciality. The Physician must be possessed of all that general medicine can teach before he can become the successful Dermatologist."

Dr. Fox's opening chapter is an admirable synopsis of the general pathology of skin diseases. Like most other dermatologists, Dr. Fox has his own views as to classification, for an examination of which he refers his readers to his little essay entitled "Classification of Skin Diseases," preferring in this systemic work to adopt a modification of Willan's arrangement. This modification is as follows:—1, Acute specific eruptions (contagious). 2, Erythematous (non-contagious), including erythema, roseola, rosalia, and urticaria. 3, Papular; lichen, strophulus, and prurigo. 4, Vesicular; eczema, herpes, miliaria, sudamina; *suborder, bullæ;* rupia, and pemphigus. 5, Pustular; ecthyma, impetigo; *suborder, furunculi,* including boils, carbuncle, and malignant pustule. 6, Squamous; pityriasis, psoriasis and ichthyosis. 7, Tubercular or degenerations; (*a*) *homologous products,* elephantiasis, framboesia, keloid; (*b*) *heterologous products,* epithelioma, cancer, cancroid, rodent ulcer (all malignant), and lupus (strumous). 8, Modifications of existing structures; (*a*) papillary, *e. g.* warts, corns, &c.; (*b*) of the vascular supply, *e. g.* purpura and nævus; (*c*) nerve supply, *e. g.* pruritus, &c.; (*d*) of colour or maculæ, ephelis, lentigo, and other pigmentary changes; (*e*) glands, of the perspiratory; or the sebaceous, *e. g.* excessive secretion, *stearrhœa, ichthyosis sebacea,* and with retention in addition, as in acne, molluscum, cornua, &c. 9, Parasitic; (*a*) vegetable or dermatophytic, as in favus, tinea tonsurans, tinea decalvans (alopœcia), plica Polonica, herpes circinatus, sycosis, chloasma, pityriasis versicolor, and the fungus foot of India. (*b*) Animal or dermatozoic, as in scabies, prurigo and pruritus from pediculi, the pulex (flea), the chigoe, the bug, and eczema, impetigo, &c. from the pediculus capitis. Syphilis is a modifying agency, and does not warrant the formation of a separate class.

This appears to us a very good arrangement, but a little pretentious. There is the same objection to it as we have advanced against Dr. Belcher's classification, viz. the assumption that the acute specific contagious diseases are affections of

the skin primarily rather than secondarily. However Dr. Fox does not enter upon anything more than a simple description of the eruptions themselves, including the typhus and typhoid rashes; and, except as regards Erysipelas, he does not consider the treatment of the acute specific eruptions. Our author treats of Varioloid and Varicella in the same section. He says:—

"These are two well-marked forms in external aspect, though they are by no means always dissociated; they are—

"1. The pustular form, or modified small-pox, properly so called.

"2. The vesicular form, or chicken-pox.

"There are differences of opinion as to whether these have any relation. Now, in epidemics of all kinds we find, while some of the patients have the disease, whatever that may be, in its fullest developed condition, others owing to certain counteracting influences, exhibit what may be termed minor degrees or abortive forms even. This is true of small-pox. The distinction of varicella (vesicular), modified small-pox (varioloid) and variola are well marked in the extreme degrees of either diseases, but they shade the one into the other by insensible stages. . . . Varicella may be regarded as small-pox modified by vaccination; it is able to give small-pox to a sound person by infection. . . .

"*Causation*, i. e. *Relation to Small-pox.*—Varicella is produced by the same cause as variola. It complicates, antecedes, or follows epidemic variola. It may give rise by infection or inoculation to variola."

Now this is a subject the importance of which cannot be exaggerated. If the affection which we term varicella is simply modified small-pox and capable of giving rise to variola, it behoves the physician to be very careful how he deals with cases of this kind. We wish Dr. Fox had furnished evidence upon which the statement is grounded that varicella may give rise to variola by inoculation. We know that the idea of the connection between these two diseases is not new. Dr. Watson* says:—

"Now these mild and irregular forms of variola, both parents and medical man, wishing, I suppose, to believe nothing in disparagement of the protecting power of vaccination, are very apt to consider, and to call, chicken-pox; and this error having been discovered, some persons have rushed to, or rather revived, the opposite

* Lectures on the Principles and Practice of Physic, Ed. 1848, vol. II., p. 805.

opinion—equally erroneous in my judgment—that there is no such substantial disorder as chicken-pox; but that all the eruptions which have passed under that name have really been forms of modified small-pox. Dr. John Thompson, of Edinburgh, is one of the stoutest maintainers of this doctrine. No doubt an eruption of short duration, and vesicular through the greater part of its progress, is often caused, especially in persons who have been vaccinated, by the contagion of small pox; but a similar eruption proceeds also from another distinct contagion, that, namely, of chicken-pox."

Dr. Copland* tells us:—

"1st. It is very difficult to determine, during a small-pox epidemic, whether the occurrence of that disease among individuals coming in contact with persons infected with chicken-pox is rather the result of this communication, than of the variolous infection which at that moment developes the malady on all sides; 2nd, Vesicular varicella, properly so-called, is not transmitted by inoculation, and never produces variola: 3rd, those persons who consider chicken-pox as contagious, have confounded it with modified small-pox: 4th, Varicella appears in persons who have not been vaccinated, and who have never had the variola; consequently, in such cases, it cannot be regarded as a variola modified by the prior existence, either of this disease or of vaccination: 5th, Vaccination practised shortly after the disappearance of varicella pursues its course in the most regular manner, which never happens when vaccination follows variola: 6th, the progress of varicella is uniformly the same whether it occurs before or after vaccination, or after variola: 7th, variola sometimes reigns epidemically, without being accompanied by varicella; and on the other hand, the latter may become epidemic without being attended by the former. In fact, the characters of the eruption, and the symptoms of varicella, differ essentially from those of variola."

And upon the point of the inoculation of varicella we may quote the following from Dr. G. Gregory†:—

"Dr. Willan has a chapter expressly devoted to the inoculation of varicella, but the evidence on which the author relied as establishing the fact is slender and unsatisfactory. Four cases only are recorded. In two of these the experiment was confused by variolous inoculation being practised at the same time. In one case no result followed. In the only case which can be in any degree relied on as affording a presumption that chicken-pox is communicable by contagion, a small vesicle raised upon a red and somewhat hard basis was discernible on the twelfth day, followed by two small vesicles

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* Dictionary of Medicine, vol. i. page 313.

† Cyclopædia of Practical Medicine, vol. iv, page 435.

on the shoulder which disappeared in two days. It is obvious that nothing satisfactory can be deduced from such an occurrence.

"The experiments of Mr. Bryce, to determine the question of varicellous inoculation, are far more decisive. The author states that he had taken lymph from the vesicles of true varicella, with the greatest care, at all periods of the disease and at all periods of the year; that he has himself inoculated, and seen others inoculate with it, children who had never undergone either small-pox or cow-pox, to the number of thirteen, yet in none of them was the disease nor anything like small-pox, ever produced. In one or two cases a slight degree of redness was observed for two or three days; but in all the rest no effect followed. These experiments are now justly considered as having settled the question, and satisfactorily shewn the impossibility of propagating the genuine lymphatic or infantile chicken-pox by inoculation."

There is no denying Dr. Fox's statement as to the simultaneous occurrence of variola and varicella, any more than one can deny the simultaneous occurrence of other eruptive fevers such as morbilli and scarlatina. But is the connection more than accidental? Within the last seven weeks we have had under our care four cases of variola—one confluent after vaccination,—eight cases of varioloides, seven of varicella and fourteen of morbilli. Many of these cases were under treatment at the same time. Cases of measles and varicella were brought from the same or contiguous house, as were also cases of varicella and varioloides. We have not the slightest doubt of varicella being due to a specific infection as distinct from that of small-pox as that of measles is. Our custom is to isolate small-pox cases whether natural or modified, but to treat varicella in the general wards of a Hospital, and we have never had any reason to regret this.

We can confirm the statements of Drs. Copland and Gregory that varicella often occurs in unvaccinated children; we have repeatedly seen the disease in young "unprotected" infants. As regards the results of inoculation, we know of no experiments beyond those alluded to by Dr. Gregory. One affirmative instance would, of course, be far more valuable than half a dozen negative ones, but a satisfactory affirmative instance has yet to be adduced. We cannot help thinking that Dr. Watson is quite right and that the question of the unity or duality of the variolous and varicellous poisons has arisen from a loose diagnosis. And further we believe that it is by no means unusual for the force of epidemic influence to be vastly undervalued,

and infection or contagion to be hastily assumed whilst epidemic power is ignored.

Dr. Fox notices Elephantiasis shortly; he shows that his book was written chiefly for European students, by saying:—

"As this is a disease which the student is unlikely to meet with, I shall content myself with giving a brief summary of what is known of it".

Our author has had opportunity of consulting the abtracts of the papers of Mr. Waring and Mr. Day, which appeared in the *Medico-Chirurgical Review,* but by a curious mistake he alludes to "Mr. Day's Researches in *Cochin* CHINA," although he says the disease is common in Malabar. In treating of Elephantiasis Græcorum Dr. Fox avails himself of the researches and descriptions of Dr. H. V. Carter of Bombay. We do not think the article on Leprosy would have suffered if the author had had opportunity of comparing some of the statements made with the results of the experience at the Madras Leper Hopital as detailed by Dr. van-Someren in vol. iii. of this Journal.

Dr. Fox is quite right in saying that his efforts at condensation have sometimes caused a sacrifice of style. At the conclusion of a very good article on *keloid* we read:—

"*Diagnosis.* The elevated tuberculous tumour with the claw-like processes, the puckered state of the skin, the absence of ill-health, glandular enlargement and ulceration, are diagnostic. In regard to the treatment, nothing is known; excision is useless; the other thing to be done is to improve the general health and to use locally mild absorbents in the shape of iodine preparations."

We do not quite understand why such diseases as Carbuncle, Rodent Ulcer, Epithelioma, and Purpura are classed with skin affections. Why should other ulcers, other cancers and other dyscrasiæ be omitted? But *chacun à son goût.*

We have read with considerable interest, and we trust with some profit, Dr. Fox's chapters on Modifications of Existing Structures; Parasitic Diseases; and the Syphilodermata. From the latter we find that our author has seen at least one number of this Journal, for he alludes to Dr. Brodrick as having called attention to substernal tenderness as a diagnostic mark of acquired syphilitic taint.

The work concludes with a copious and useful formulary. We cannot too highly praise the thoroughly scientific and

practical character of this treatise, and we cordially commend it to the notice of our readers as either a student's text-book or a reminder for the busy practitioner. The typography is remarkably clear and the paper thick and good, no small recommendation in a book which has other uses than one simple perusal and a place on the library shelves.

Dr. Fox's pamphlet on the Action of Fungi in the production of Disease, from the Edinburgh Medical Journal for April 1866, has probably come under the notice of most of our readers. It is a supplement to his admirable treatise on Parasitic Affections of the Skin, and, as it is a very thoughtful paper, an hour may well be spent in its perusal.

It embraces an enquiry which branches in three directions.

I. Are the so-called parasites vegetable or not, in nature?

II. Are not most of the forms usually considered distinct, but varieties of a very *few* perhaps *one*, species?

III. Are fungi "accidentals" in disease, or do they necessarily directly or indirectly cause any special morbid changes; if so, of what nature are these?

On the first point, our author says:—

"It is admitted on all sides, with scarcely one single exception, that the fungi met with browsing upon and within our surface are really of vegetable nature, that the germs are derived from the exterior, and that there is no such thing, as some have indeed imagined, viz., a conversion of the elementary particles of the animal structures by a process of degeneration into those of vegetable nature, may I say a heresy that would uproot every sound principle of physiology, an ultra-polymorphism which denies *in toto* the existence of any law of limitation, the inter-dependence of life, and whose fair application legitimately carried to its fullest extent would arrive at a *reductio absurdam* the most amusing."

This is a hard hit for Mr. Erasmus Wilson and his supporters. But Dr. Fox is not content with bare assertion; he offers proof of the vegetable nature of the parasites.

1. The cryptogams vegetate freely when removed from the presence and influence of all living animal structures. We have ourselves lately had instances of this with regard to the favus *Achorion* and the *Chionyphe Carteri* of Madura foot.

2. Spores, sporules and mycelia resist the action of re-agents, especially of liquor potassæ, whilst animal structures swell up and become indistinct under the influence of these re-agents.

3. Identical parasitic structures may be found in the hard tissues of animals and indeed of vegetables.

4. The want of transitional forms. Normal nuclei may be confounded with sporules, but liquor potassæ will determine the difference. Directly the tubed phase (mycelial) commences, all similarity goes at once.

5. If the so-called fungus is a granular degeneration, such degeneration must commence where the nuclei are formed, and abundant in the early developmental stages, viz., at the formative papilla of the hair. But the earliest trace of spore, sporule, or mycelium is subepidermic and located at the upper part of the hair follicle, from thence it may be traced downwards to the bottom; so that there is *à priori* evidence that the germs of the parasite are derived *ab externo.*

6. Remove or destroy every vestige of parasite, in the early stage particularly, and the disease is stopped. To affirm that this could alter such a thing as "granular degeneration" is not conceivable.

II. As to the *variation* of fungi. De Bary has shown that fungi which do not infest the human body, and which have been described as distinct species, as uredo, uromyces, puccinia and æcidium, are varying forms of the same fungus. Dr. Fox enters somewhat fully into this subject and concludes thus:—

"If I were asked to sum up briefly the results of the most recent minute observation, I would say that the parasitic fungi found upon *the human surface* are varieties which cluster around the penicillium or torula in their sporular state as the type; that in the air the tendency is to the aspergillus form of fructification; that the parasites of the mucous membranes, or entophytes, are more or less forms of oidium, mycelial forms of the sporous state of penicillium; that sarcina is a conjugated form of the latter. Chionypte Carteri, the fungus of the Madura foot, being nothing more or less than a higher stage of the oidium, approaching closely the genus mucor. I do not comprehend the distinction of aspergillus, penicillium and mucor *as seen on the human surface,* having noted all the appearances supposed to be characteristic of each, in the development of the same fungus penicillium taken from the

contents of the stomach of a pyrotic patient. Human parasitic cryptogams furnish capital exemplification of polymorphism; our duty is plain: to investigate and define the special diseased conditions which are related to and indicated by special phases of fungus."

The *modes of entrance* of the fungi are next considered; the summing up being as follows:—

1. That through the natural orifices: 2. That in which the growing force forces the mycelial thread beneath the layers of the superficial tissues; 3. That in which processes shoot out from the spore and enter by such openings as stomata; 4. That where the cell contents are absorbed; 5. That in which the spores are carried bodily inwards by growing parts; or (6) dissolve away the opposing structures by chemical action; or (7) enter by traumatic lexions. In each and every instance the germs of parasites are derived *ab externo* and not generated *spontaneously.*

III. For the third point we must refer our readers to Dr. Fox's pamphlet. He points out that parasitic disease "consists of three distinct components, which must be recognized, if the physician would cure his patient well and quickly."

1. A certain state of soil: each variety of fungus appears to require its special kind of pabulum.

2. The access of air, and the presence of heat and moisture,—the conditions necessary to support the life of fungus.

3. The introduction from without to, and action upon, the body of the vegetable germs.

Upon this latter point Dr. Fox shows that fungi may act—1, mechanically, producing irritation; 2, by inducing local chemical change; 3, as conveyers of poison; and 4, as developers of poison (zymosis).

"Parasitic disease, then, is a composite affair, consisting of mal-nutrition, a growing parasite, and certain effects of such growth."

This subject is an extremely interesting one, and as India affords abundant examples of epiphytic and endophytic disease, a fine field of investigation is open to any medical man who has a good microscope and plenty of leisure at command. The subject is not exhausted, multiplication of facts

is required, and it is within the bounds of possibility for a careful observer to immortalize himself as regards general parasitic disease, as Carter of Bombay has done with respect to mycetoma.

The work, the title of which is placed last on our list is, we believe, the latest published systematic treatise on dermatology. Its author was a few years since an Assistant Surgeon on the Bombay Establishment, and was unfortunately compelled by ill health to resign his commission.

The book is dedicated to Mr. Startin, "teacher and friend" of the author. As Mr. Startin fulfilled the former office it would have been Mr. Nayler's own fault if he had not arrived at the position, which his work shows he has attained, of a skilful dermatologist.

As regards classification, Mr. Nayler acknowledges that the obscurity which envelopes the pathology of skin disease militates against the completeness of any system, but he is not acquainted with any which, in utility, can supply the place of that of Willan, which is still followed both at home and abroad.

"In the present volume, the squamous, papular, vesicular, and pustular affections are comprised in as many groups. Other diseases as, for example, lupus, elephantiasis, and alopœcia, which have their own distinctive characters, are arranged separately. If exception be taken to those which, arising from a vegetable parasite, more properly pertain to a special order, as pityriasis versicolor, tinea tondens, and favus, the author may reply, that he has preferred to retain the names by which these complaints are best known; their re-arrangement as a class by themselves would be unattended by any practical result."

As regards the first two sentences in the above paragraph we have nothing to say beyond congratulating ourselves upon meeting with a work on skin diseases, from which such affections as the exanthemata, cancers, and ulcers are excluded. But we fail to see the logic of the last sentence, which says in effect that because the author prefers to retain the best known names of certain affections, there would be no convenience in classing them as a special order. It may be true that if the parasitic nature of certain affections is fully recognized no *practical* result would occur from their arrangement in a class by themselves, but surely the *unities*

would be better preserved, and pathologically there would be some attempt at a *natural* classification.

We make no pretension to having read the whole of Mr. Nayler's book, it reached us too late for that to be possible; but we have perused sufficient of it to enable us to say that we think the above subject (and that is unimportant) the only one upon which we could possibly join issue with our author.

The first chapter is devoted to the anatomy—and we might add, partly to the physiology—of the skin and its appendages. It is very carefully written and beautifully illustrated by six plates by Tuffen-West and Aldous, chiefly figures copied from preparations in the Museum of the Royal College of Surgeons. Some of these plates are coloured, such as those illustrating the arrangement of the blood vessels of the skin and those beneath the nails. So familiar do the latter appear to us that they might very well have been copied from some fine injected preparations, by Mr. Rainey, which are in our possession. Plate vii. illustrates the structure and development of the Acarus (Demodex) folliculorum and of the Acarus (Sarcoptes) scabiei. Plate vi. affords good illustrations of some vegetable skin parasites, Achorion Schönleinii, Microsporon furfur, and Trichophyton tonsurans.

Mr. Nayler's descriptions of disease appear to us to be very faithful. They are free from diffuseness, perfectly clear, and succinct without any loss of perspicuity. To a certain extent the book partakes of a clinical character, illustrations being afforded by reference to cases which have been under the actual observation of either the author himself or some of his friends. His position as Assistant Surgeon to the Hospital for Skin Diseases in Blackfriars ensures that all that is said as regards therapeutics is of the most reliable character, and embraces the most modern experience. We observe that he speaks very highly of carbolic acid as a lotion in Psoriasis and Lepra.

As regards some disputed points we have referred to Mr. Nayler's work, and we find that he is of opinion that Alopecia areata is not a parasitic disease. He alludes to Bazin and Hardy as holding the opposite view, and to Mr. Hutchinson as having once detected the microsporon, but his own researches have been fruitless as far as they relate to the discovery of a fungus. And as regards Sycosis he has, in a few

instances, discovered the parasite, but he believes it is seldom present, and that its presence, when it exists, is accidental, and not an essential condition of the complaint. Concerning the term Porrigo, Mr. Nayler says :—

"I purpose to limit its signification to one disease, and accept the definition of it as proposed by Mr. Startin, viz., that it consists of an eruption of large flat pustules, covered with thick crusts, and is contagious ; it occurs on an otherwise sound skin, without a surrounding inflammatory base."

Our author has not discovered a parasite in this affection, but he figures a particular condition of the hair which, so far as he knows, is peculiar to Porrigo :—

"The hair bulb becomes flattened and expands into a broad and thin plane, which terminates in an even edge . . . Fig. 1 is club-shaped, but this character is witnessed in other cutaneous complaints. The lower part of each hair, extending to the bulb, exhibits a series of irregular rings ; but this, again, is not peculiar to porrigo, although well exemplified in this disease."

The above quotation affords a very good specimen of the care with which any statement is advanced by Mr. Nayler. As concerns Herpes circinnatus (tinea circinnata) and Favus, Mr. Nayler admits that they are undoubtedly due to the presence of a fungus.

Our author's Indian experience has enabled him to write a very readable and correct account of Elephantiasis. He has had opportunity, of course, of referring to the recorded observations of his former confrères of "Her Majesty's Indian Service" and fully avails himself of the same.

There is but one point which we feel inclined to notice. Mr. Nayler, speaking of E. Arabum, says :—

"It sometimes happens that during the febrile paroxysm a clear discharge exudes from the skin of the scrotum. This is always a favourable sign, and seems to be an effort of nature to throw off the disease."

We are not quite sure whether our author is here alluding to the same circumstances that we have in our minds, but we have several times observed in *small* scrotal elephantoid tumours, especially towards the more depending parts, small semi-globular elevations, covered by the thinned integument, varying in size from a small split-pea to a pin's head, and evidently containing fluid. In the first case we met with, some of these little tumours had given way and

there exuded a large quantity of a slightly opaline fluid, which presented all the characters of lymph, coagulating, upon standing, into a soft jelly-like mass. In other cases we have punctured many of the swellings with the point of a lancet, and from one patient have collected as much as twenty ounces of lymph in twenty-four hours; and the flow has gone on for several days. The patients were not suffering any febrile paroxysm at the time. We know not the subsequent history of the patients, but we are under the impression that the discharge of lymph had the effect of arresting, at all events, any speedy increase in size of the tumour. We have not obtained this lymph from any of the large, and more advanced scrotal tumours; neither have we observed any of the little fluctuating swellings in elephantiasis of the extremities, though we by no means deny that they may exist there, in the earlier stages of the disease. The tumours we allude to are most probably dilatations of the superficial lymphatic vessels; and their having been noticed chiefly on the scrotum may be accounted for, perhaps, by the greater relative delicacy of the skin of this part. We believe that almost all observers who have written upon elephantiasis have mentioned that pain and tenderness in the course of the lymphatics of the affected part is usually noticed during the febrile accession,—and we lately saw some remarks upon the elephantoid affection of the lymphatics in one of the English medical journals, but we regret to say that we omitted to take any notes, and therefore cannot refer particularly to them.

Mr. Nayler's work concludes with a chapter on a very important subject, viz., Diseases of the Skin following vaccination.

We say the subject is an important one, because it is our belief that it lies at the root of the general prejudice against vaccination. Among all classes in England we have repeatedly heard the objection "Oh! yes, it is true that vaccination will prevent small-pox, but it gives rise to other eruptions and to bad disorders." We think that the Profession has its prejudice on this subject, and will not give credence to the statements of laymen, and pooh pooh them with the reply "*post hoc, sed non ergo propter hoc.*" Mr. J. Simon very strongly contested the transmission of syphilis by vaccination,—and of course this is the one point in the discussion which is most worthy of consideration. Mr. Nayler relates

three cases which he thinks cannot be explained except on the belief that syphilis has been transmitted through the medium of vaccination. However, he says the cases are infrequent, and do not affect the more general question of its vast and undoubted utility. We merely allude to the subject here to impress upon all vaccinators the propriety of attending to one of the rules laid down by Dr. Tilbury Fox:—"Be very careful not to use the vaccine matter which has been taken from any member of a family in which syphilis has occurred."

In concluding this notice of Mr. Nayler's book, we must congratulate him not only upon his own share therein, but also upon the attractive nature of the "getting up." To mention the Messrs. Churchill as the publishers is to give a guarantee that every thing has been done to secure artistic execution. The illustrations we have already spoken of as beautiful; the type is very clear and the paper is of that delicate toning so much approved of by ophthalmologists.

A Handy-Book of Ophthalmic Surgery for the use of Practitioners. By JOHN Z. LAURENCE, F.R.C.S., M.B., (University London), and ROBERT C. MOON. With numerous illustrations. London: R. HARDWICKE, 1866. 8vo. pp. 160.

THE authors of this little work, which is quite correctly designated a handy-book, are respectively Surgeon and House Surgeon to the Ophthalmic Hospital in Southwark, and they tell us in their preface that the practice they describe is that pursued at this Hospital where 6,000 patients are treated annually. "During a period of upwards of eight years the 'letters' of all our patients have been preserved and bound up at the end of each year. Thus the experience, on which the practice we advocate rests, has the guarantee of the written records of several thousand observed cases." These records have been availed of also to serve as illustrations of disease, thus we find thirty-four representative cases distributed through the book.

Condensation has been one of the chief aims of the authors; thus they tell us:—

"In describing symptoms, we have limited ourselves to those which are essential for the *recognition* of disease; in describing operations, &c. to those details which are essential for its *treatment*. At present it matters little to the practitioner whether glaucoma depend on a hypersecretion of the fluids of the eye, or on a rheumatic state of the circulation, or on an obscure affection of the ciliary nerves, &c., what he chiefly wants is, how to know glaucoma; and, when he knows it, how to treat it."

Of course our authors do not intend to intimate that the consideration of the pathology of the diseases they describe is unimportant, but that, as their only object is to supply the wants of "the busy practitioner," any discussion of disputed pathological points would be out of place in their work and foreign to its character.

Ophthalmic, and especially Ophthalmoscopic, Surgery has been so fully discussed in the pages of this Journal, not only in the interesting and scientific contributions of Dr. G. Smith, but also in the able review* of Mr. Jabez Hogg's Manual, which appeared in our sixteenth number, that we have no intention of entering on any enlarged notice of the work before us.

The book is divided into seventeen chapters; the first of which is on the methods of examining the eye; and of course a succinct description of the ophthalmoscope is to be here found. The authors select Liebreich's monocular instrument and Laurence and Heisch's modification of the binocular of Dr. Giraud-Teulon, for description; and short instructions are given for their use. The chapter includes also the modes of investigation of visual power, the refraction and accommodation of the eye, the extent of the field of vision, and the existence of binocular, uniocular, and double vision.

The second chapter contains some general remarks on ophthalmic operations. The authors are much in favour of the use of a head rest in all operations on the eye, and they

* We have no hesitation in characterizing the Review alluded to by the adjective "able," and we are not overstepping the bounds of modesty in doing so, for it did not emanate from the Editor's pen, but was kindly furnished by an accomplished oculist.

figure an apparatus—a cephalostat—invented by Mr. Laurence, which appears well adapted to answer the purpose intended. Supposing that there are no contra-indications to its use, it is recommended that chloroform should be employed to complete anæsthesia in ophthalmic operations; the authors specially inculcate its use in the extraction of cataract, believing that preconceived opinion has been invoked, in place of experience, in attributing expulsion of the vitreous and intraocular hæmorrhage to vomiting resulting from chloroform inhalation.

The subsequent chapters are on the diseases of the orbit; eyelids; lacrymal apparatus; muscles of the eye; injuries of the eye and orbit; diseases of the conjunctiva; sclerotic; cornea; iris and ciliary body; and crystalline lens; amaurosis and amblyopia; glaucoma; diseases affecting the whole eyeball; on vision; and optical defects of vision.

As a specimen of the manner in which our authors deal with their subject, we will quote a complete section from their fourth chapter.

"*Ophthalmia Tarsi*, or inflammation of the edges of the lids, presents some special characters. It occurs in a sub-acute or chronic form, very commonly in scrofulous children. The tarsal borders of the lids become red and thickened, and matter accumulates at the roots of the lashes. These thus become glued together; especially the first thing in the morning. The tears secreted in excess, in consequence of the inflammation, overflow the palpebral sinuses, run down, and excoriate the skin of the cheeks. The lashes often become loose, and fall out; and, in old chronic cases, may all disappear, leaving a raw, red, smooth, and thickened margin to the lid, constituting that very intractable condition known as 'lippitudo.'

"There are two very common conditions of the puncta lachrymalia, which are frequently met with in lippitudo (especially in old people), which may, if overlooked, render the most protracted treatment ineffectual. We find the puncta everted, turned away from the surface of the eyeball, or skinned over by plastic membrane. In either case they no longer fulfil their physiological function—that of receiving the tears as they distil down over the surface of the eyeball. Hence arise watering of the eye, a continuance of the chronic conjunctivitis, and even ectropion—all three effects acting and re-acting on each other, so as to form an accumulated fund of discomfort to the patient. Such cases, after having been treated *ad infinitum* by all varieties of lotions and ointments, we have,

over and over again, seen cured at once by slitting up the canaliculus. Effects had previously been mistaken for causes.

"The treatment of ophthalmia tarsi consists in warm fomentations or poultices to the edges of the lids, and removal of the crusts of matter, followed by the application of the red or yellow ointment to the diseased surface beneath. In the lippitudinous stage, occasionally pencilling the tarsal conjunctiva just within the free edge of the lid with nitrate of silver will be found a valuable adjunct to the above treatment."

There are some points in the practice recommended by our authors to which exception might be taken. For instance, all that they say regarding the treatment of chemosis is as follows :—

"Both forms should, if necessary, be treated by scarification with a lancet, or, if the vitality of the cornea should appear threatened, by excision of the morbidly thickened structures with curved scissors."

We contrast this with the following extract from Dr. G. Smith's Lectures on the conjunctiva in health and disease :*—

"Chemosis is best removed by pressure. In some cases the warm water compress, is the most useful; in others the cold water compress, and in others the dry compress answers best. Astringents such as the acetates of lead, alum, or of zinc are also of great service. It was at one time the practice to scarify congested lids, and to incise the chemosed conjunctiva in cases of conjunctival inflammations of the catarrhal and purulent types; my own experience is against the practice, but in favour of pressure combined with cold or heat."

As regards Iritis our authors say :—"Mercury is generally regarded as the *sine quâ non* in the treatment of iritis; we, however, do not give it; our cases, we find, get on as well without it."

Concerning the extraction of cataract, the experience at the Southwark Hospital is, in respect of flap-operations, in favour of that of Mooren performed under the influence of chloroform. But of all the operations hitherto devised, Messrs. Laurence and Moon prefer, in proper cases, Mr. Critchett's modification of Waldau's (Schuft's) operation.

* See Page 75, No. XIX. of this Journal.

They object to the original operation of Schuft on the grounds that the incision of the cornea is too small, so that either the cortex of the lens is rubbed off during its extraction, or the iris and lips of the corneal wound are bruised ; and the spoons are far too bulky ; either the lens is broken, or the hyaloid fossa is ruptured. They consider that enlarging the incision to from one-fourth to one-third of the circumference of the cornea, and the substitution of Critchett's spoon for that of Schuft (the edges of the latter being too high and rough), leave nothing to be desired in the shape of an extraction operation. They do not mention the modification of Schuft's operation practiced by Dr. Macnamara of Calcutta.

Our authors are so assured that iridectomy is absolutely *the* remedy for acute glaucoma, that they consider it "almost criminal" to temporize with the disease. They do not notice division of the ciliary muscle as proposed by Mr. Hancock, as a remedy for glaucoma, but we may remark that Dr. G. Smith finds this more simple operation quite efficacious, and far better borne by the native eye than iridectomy. Full directions for its performance will be found at page 378 of vol. viii. of this journal. Our authors say that it is an undeniable fact that certain sub-acute cases of glaucoma recover under general treatment—belladonna and iodide of potassium internally, and atropine topically.

The chapters on Optics and the Optical Defects of the Eye are carefully written, and contain some very interesting matter, but the space at our command forbids us to further allude to them.

The book is handsomely got up. The paper is good and hot-pressed which gives a great clearness to the wood-cuts which are good specimens of the art. Although the number of pages it contains are but 155, yet by the use of small but very clear type they have been made to hold a great amount of matter. Mr. Hardwicke certainly rivals the Messrs. Churchill in the elegance of the books which bear his imprint. We recommend this handy-book to our readers as likely to be of great assistance to them in the diagnosis of cases in which difficulty may be felt.

The Madras People's Almanac and General Directory, for the year 1867. Madras: GANTZ BROTHERS, Royal 8vo. pages 450, and Appendix lv.

THE People's Almanac is as much one of the "institutions" of Madras as is the People's Park with which it is coeval, and which is the only "institution" of which we can find no notice in the volume before us. The present is the eighth year of the existence of this Almanac, and certainly it has been a progressive work, for every issue has been an improvement upon its predecessor. The publishers have this year added the rules and regulations of the Civil Service, "so that now every branch of Her Majesty's Service is fully represented." They call attention to "a classified table of contents adopted in lieu of the usual unwieldy index," but we do not quite agree with them that this is a great improvement, because so much depends upon the taste and fancy of the classifier, and there can be no doubt that nothing so facilitates reference as a good alphabetical index. At all events if the "classification" is retained, we would suggest that at least the heads and the items under each head should be arranged alphabetically.

The book is very neatly got up and wonderfully cheap. It will be found to save its possessor an immense deal of correspondence and reference upon various matters, inasmuch as it contains full information upon all such subjects as the Railways, Steam Navigation Companies, the Carrying Company, the Postal Department, Stamps, Custom House rules, &c., and the regulations and office-bearers of Societies and Associations of every kind and description, together with both a Mofussil and Madras Trade List. Of course there are some inaccuracies as regards office-bearers, as changes occurred in some instances whilst the book was passing through the press, but these are few and of no import.

As immediately concerning the profession, we find a complete list of the Medical Establishment, and on pages 431 and 432, what cannot but prove useful, not only to practitioners but also to expectant mothers, a table containing the names, race, date of certificate, qualification and residence of 87 qualified mid-wives and monthly nurses.

We recommend the work to the notice of our readers, as an indispensable companion to the writing table.

PART III.

MEDICAL MISCELLANY.

No. 1.—*Notes of a Case of "Scarlatina Rheumatica" or "Dengue."* By Surgeon H. R. OSWALD, M.D., Surgeon to the Mysore Commission.

C. B., an East Indian boy of fair complexion, aged 12 years, was attacked on the 8th December 1865 with the ordinary symptoms of continued fever; they were not severe, and there was nothing unusual in the case, except that he complained of a pain in the right knee extending to the ankle. The fever continued on the 9th without abatement, but was not strong, his pulse not going above 100.

On the 10th, an eruption appeared all over the arms and legs, and face, exactly resembling the eruption, as it first shows itself, in Scarlatina; there was no throat affection whatever; the febrile symptoms were increased, there was pain in the eye-balls and a good deal of injection of the conjunctival vessels; the pain in the knee continued the same.

On the 11th, the eruption had come out much more distinctly: it was bright scarlet, covering the face and extremities, very little on the trunk; the pain in the eye-balls, and injection of conjunctival vessels continued unabated as well as the fever; there was still no affection of the throat.

On the 12th, the above train of symptoms continued without any mitigation; the eruption, in fact being more intense; he also began to complain of pain in all the joints, which were excessively tender to the touch; the ankles, and wrists were slightly swollen, the face likewise was a good deal swollen, and the eyes continued much inflamed. He said his eyes felt too large for his head. The urine was not very

high-coloured. The pulse 100. The throat still continued free, nor was there any glandular swelling about the neck.

It is needless to follow the case day by day any further, as the symptoms continued much as related above, except that the fever, for a few days, showed a decided tendency to increase about 10 A. M. and to remit at 4 P. M.; and there was a slight affection of the mucous membrane of the nostrils, but none of the throat; the pulse never rose above 100, was more generally 96, and sometimes inclined to intermit. The rheumatic symptoms were very severe, and he was for several days quite unable to stand or feed himself.

On the 23rd December for the first time the fever decidedly abated, and the eruption was perceptibly paler; the rheumatic pains and swelling of the joints had likewise much abated, and he was able to stand and feed himself.

On the 25th, he was quite free from fever and pains in his joints, and the eruption fading.

27th.—Eruption still fading, skin *desquamating*, and nothing to complain of except debility.

4th January 1866.—Skin desquamating *very freely*. Eruption not yet disappeared. Is very well, but still weak.

On the 1st March, the skin had not yet recovered its natural clearness (it did not do so for some time after) and assumed a dark hue on any excitement; the boy is, however, in perfect health.

The treatment consisted of mild aperients, diaphoretics and opiates (which were well borne) with small doses of the Iodide of Potassium and Bicarbonate of Potash. Nothing except the opiate seemed to have any influence on the disease.

The foregoing is an abstract of a case of what appears to me to be "Scarlatina Rheumatica," and which I believe to be now a very rare disease. The case exciting a good deal of interest and attention, at the time, amongst the boy's friends, who are influential East Indians, enquiries were diligently made by them, for similar cases amongst the natives, some of whom professed to know the disease well, and called it the "Stompock,"—they said the attack generally lasted forty days, was never fatal, but highly infectious, and that convalescence was always tedious and slow. None of my Medical Subordinates knew anything about the

disease, nor had the Medical Officers to whom I mentioned it ever seen a case. I had never seen a case of it before either, and my curiosity being a good deal excited, I subjected all the patients attending daily at the Pettah Hospital (of whom there are a large number) to a close scrutiny, and shortly a man (a traveller) applied for admission as an in-patient, on account of "Fever and Rheumatism;" on examining his skin closely, it was found to be covered with an eruption of a *shade* darker than his skin, which might have been easily overlooked. His eyes were inflamed and he complained of a burning pain in them, and in short of all the symptoms related in the foregoing case, but in a mitigated degree; still the case might have been put down as *syphilitic* (though the man denied ever having had syphilis) until the skin *desquamated very freely*, which I considered was quite conclusive of its nature. I have never met with a case since, and I must conclude therefore that it is now not a common disease; otherwise in the large field of observation I have the advantage of, some cases must have occurred. The only other instance approaching to it I have *heard* of, is that of a European Missionary, who stated that some years ago, whilst stationed at a district of Mysore, far away from Medical aid, he suffered from a precisely similar train of symptoms, but did not know what was the nature of the disease.

Copland is the only author at my disposal, who gives any account of the disease, and his description agrees in all essential particulars with the symptoms observed in this case, excepting the duration of the eruption, which, in this instance, was much longer than is stated by him. This symptom, however, he says, is described differently by different authors. The disease, according to Copland, would appear first to have made its appearance in Rangoon and Bengal in 1824, where it was very severe. It next appeared in the West Indies in 1827, and travelled northwards through the Gulf of Mexico, New Orleans and Charleston, which town was very severely visited. A few cases appeared in New York and Philadelphia, but it did not extend further. In the Island of St. Thomas, it is stated that out of a population of 12,000, scarcely one escaped.

Tanner in his "Practice of Medicine," 4th edition, makes a passing allusion to the disease as prevailing in the East and America, and states that it is "peculiarly infectious."

No. 2.—*Jaundice; Distension of the Gall Bladder; Obstruction of the Cystic and Pancreatic Ducts; Disease of the Pancreas.* By Assistant-Surgeon W. H. MORGAN, 23rd W. L. I.

A. M.———, aged 47, twenty-six years resident in India.

In August 1864, March and July 1866, the patient was under treatment for dysentery. Had jaundice in the latter end of July, and was transferred under this head on the 1st of August with yellowness of the conjunctivæ and of the skin generally; tongue at first tremulous, thickly coated at the base, red at tip and edges; stools generally figured and of a drab colour; urine of the colour of porter, showing the presence of biliary pigment when treated with nitric acid, quantity passed during twenty-four hours seldom below ℥xxv., frequently more. The liver dulness extended a little below the level of the ribs, and a tumour which could be grasped in the hand was repeatedly felt about three inches to the right of the umbilicus, when the patient was lying down. This was regarded as the fundus of the gall bladder. He could bear pressure over the right hypochondrium, but suffered occasionally from pain (the nature of which he could not describe) in the epigastric and umbilical regions. The escape of gall stones through the biliary ducts was suspected from the above symptom, but the most careful search for calculi in the excretions was fruitless; no pyrexia, no night sweats, no acceleration of pulse in the evenings, no irritability of stomach. On the 20th August the patient passed a quantity of tenacious mucous which, under the microscope, appeared to be made up of broken-down epithelium, granular corpuscles, &c.

On the evening of the 7th of September, the pulse was above 100, but observations made daily since then did not show it higher than 87 in the afternoon. During the month the patient lost flesh, the bowels moved once in twenty-four hours as a rule, the stool being figured and of a slate colour, urine as before described. Hiccough was present for some days in the month; relieved by the administration of sulphuric ether in cinnamon water.

Seeing no improvement in the case, and the patient's wish to serve a few months longer being overcome, the documents necessary for his removal to the depôt at Poonamallee were forwarded for counter-signature in the middle of October, and permission for his transfer published in orders on the 28th of that month, but two days previously he took to his bed, being unable to sit up. The emaciation progressed, and from this time he slept badly at night, his thoughts were wandering and he had dismal forebodings.

For the first four days in November the temperature of the axilla was higher than usual, ranging from 99°—105°F., subsequently both temperature and pulse were normal, the only exception to the former being on the 12th November, when it stood at 105°, and to the latter on the 8th of the month when the number of beats of the pulse are recorded as 100 per minute. From the 6th November the stools were passed in bed; they were of a dark colour and very offensive; pellets of fat were seen in them since the 8th, and on that night he had cold and copious sweats; the abdomen was considerably distended.

November 15th.—Blood mixed with a stool passed during the night, pellets of fat passed as before. Patient dozes day and night; is too weak to spit out the secretions collecting in his mouth.

20th.—Getting worse, features pinched, thoughts wandering, troubled with incessant hiccough since 11 A. M. yesterday, which the former remedies now fail to arrest.

21st.—A quantity of tarry-looking stuff has been passed by stool. I am unable, after a microscopic examination, to satisfy myself that this consists of broken-down blood corpuscles; treated with sulphuric acid and sugar, on the other hand, it did not yield the red or violet tinge of bile. On the 26th there was no improvement, the stomach was irritable, and the patient did not evince any inclination for nourishment. Three days after (on my return from other duty at Negapatam) the patient did not recognize me as usual, and I was informed by his attendants that there was great difficulty in keeping him in bed on the preceding night; his speech was embarrassed, respiration becoming difficult; towards evening the pupils were insensible to light, and he died at 12-30 on the 30th Nov.

Treatment.—The bowels, when confined, were acted on by purgatives such as Seidlitz powders; the sulphate and carbonate of magnesia with infusion of senna; podophyllin; Plummer's pill with aloes and soap; enemata of castor oil and turpentine. For the first three weeks in August the patient had taraxacum with dilute nitric acid and infusion of quassia; from the 22nd August to the 10th September he got a mixture of carbonate of soda, infusion of calumba, tincture of rhubarb, and nitrate of potash; from that date up to the 9th October, quinine first with tincture of the muriate of iron, and subsequently without it. From the 9th October he was given a mixture of acetate of potash, taraxacum, conium, &c., and latterly the preparations of ammonia, the decoction and tincture of bark. From time to time he had a variety of applications to the right hypochondrium, such as turpentine epithems; linseed meal poultices; the compound tincture and ointment of iodine; turpentine with ammonia liniment; nitro-muriatic acid, &c.; anodynes were given to relieve pain and to procure sleep. The diet was simple with a daily allowance of wine, and latterly brandy. Early in August the patient had a change of air to the coast, but as he was not comfortable in the quarters he had there he soon returned, and used to go out every evening for exercise in a bullock coach till he was too weak to do so.

Autopsy held 8 hours after death; Temperature 79° Ft., weather cloudy.

Head.—Not examined.

Chest.—Heart, large and flabby, some fluid in the pericardium. Lungs, both healthy and adherent to the parieties of the thorax by old adhesions.

Abdomen.—There is a large development of subcutaneous fat: about seven quarts of fluid in the peritoneal cavity of the color of a strong infusion of tea. Omenta loaded with fat. Liver of a dark bluish colour adhering in two or three places superiorly to the diaphragm, scarcely projecting below the margin of the ribs; capsule can be easily torn off, parenchyma friable and more or less congested, no abscesses. Gall bladder pear-shaped, projecting for some inches below the right lobe in the situation noted during life, and very much distended. On laying it open at its most dependent part ℥xiv. of bile escape, black in colour

and of the consistence of treacle. A probe passed into this organ *in situ* can find no outlet, but on removing it and laying it open throughout its length an opening just capable of admitting the point of a probe is discovered leading to the duct which a little beyond this is again impermeable. There are no gall stones in the bladder or duct. The duodenum is laid open and the openings of the pancreatic and common duct carefully searched for without success. The mucous membrane at the usual situation of these ducts and for some inches both above and below these is congested and of a redder colour than other portions of this bowel. The Pancreas is hypertrophied especially towards its head, its duct is distended with a light yellowish fluid, some of which escaped by an incautious incision, the duct admits the tip of the thumb at its widest part. The room in which the examination was conducted was dark, and it was not easy with the aid of a lighted candle to ascertain several other points which greater care and skill might have cleared up. Spleen healthy. Portions of the small and large intestines were laid open *in situ* and found free from ulceration. Kidneys somewhat large and congested. The other urinary organs were not examined; and through an oversight the stomach was not laid open.

Remarks.—That this was a case of jaundice from obstruction and not suppression, was supposed during life from the presence of the pear-shaped tumour to the right of the umbilicus, though occasionally doubts arose in my mind as to the contents of the tumour from reading cases recorded by Bright.* In the progress of the case the discharge of pellets of fat by stool being mentioned to Surgeon-Major Ranking (who as well as the Deputy Inspector-General of Hospitals, Southern Division, had kindly seen the patient) he drew my attention to the connection between it and diseased states of the pancreas, and which it will be remarked was verified at the post mortem examination. Kirkes† refers to numerous cases recorded in the Transactions‡ of the Royal Medico-Chirurgical Society in which the pancreatic duct being obstructed and the liver coincidently diseased, fatty or oily matter was abundantly

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* See Bright's Clinical Memoirs on Abdominal Tumours (republished by the New Sydenham Soc.) Cases 13 and 14, pp. 277—79.

† Hand Book of Physiology, 5th Ed., p. 264.

‡ Vol. xviii. p. 57.

discharged from the intestines. The gall bladder is ordinarily capable of containing eight or ten fluid drachms*, and in this instance I found ℥xiv. of bile. Frerichs † in the cases that came under his observation did not find more than from ℥viii. to ℥xvi., though he says "the older physicians mention cases in which the quantity was more considerable," from seven to eight *quarts*.

No. 3.—*Case of Compound Fracture of the Cranium, Coma, Death.* By LEWIS C. NANNEY, ESQ., Assistant-Surgeon, doing duty General Hospital, Madras.

MUNGATHOYAMAH, (female), aged 70 years.

4th December 1866.—Admitted into the General Hospital at 4-30 P.M., having just sustained injuries by being knocked down and kicked by a pony.

She had lost a considerable amount of blood and was suffering from the effects of shock. Surface of body quite cold, pulse scarcely perceptible. No hæmorrhage from either nose or ears. A semicircular lacerated wound, about two inches in length, existed over the frontal bone just above the right orbit. The bone was exposed and fractured. Another wound existed above and behind right ear, separating the upper attachment of the helix. A stellate fracture of the bone existed here, one ray running forwards to the external angular process, and another backwards beyond the limit of the external wound. There was also an oblique fracture of the lower end of right radius.

The wounds were dressed with wet compresses and bandage, some food and stimulus given, and the patient removed to the ward. In the evening some smart hæmorrhage occurred from the wounds necessitating the removal and re-adjustment of the dressings.

For the first day or two the patient continued apparently under the influence of shock. Some serous oozing occurred from the right ear, signs of compression came on, and she fell into a comatose state. There was no attempt at

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* Quain and Sharpey's Anatomy, 5th Ed., vol. ii. p. 1073.

† Clinical Treatise on Diseases of the Liver, (pub. by the New Syd. Soc.) Vol. i. p. 130.

rallying; she became weaker and weaker and died on the 12th December, eight days after the receipt of the injury.

Autopsy, 14 hours after death.

Body emaciated. Right radius fractured.

Head. The wounds above described were seen to exist without any attempt at reparation.

On removal of the scalp and right eyeball, a fracture was detected extending from about an inch to the right of the mesial line of upper border of frontal bone (the sutures were obliterated) forwards and obliquely downwards to near the external angular process, and then across the orbitar plate of the bone and the lesser wing of the sphenoid terminating in the sphenoidal fissure. The bones of the inner wall of the orbit were comminuted. A second fracture, enclosing an oval-shaped piece of bone about an inch in breadth and an inch and a half in length, commenced at the right temporo-maxillary articulation and extended through the squamous portion of the temporal bone. The right zygoma was fractured at its junction with the malar bone, at its middle, and again at its root, the fissure extending across the base into the petrous portion of the temporal bone. The roof of the left orbit was fissured and there was slight extravasation of blood there. There was also a fracture of the nasal process of left superior maxillary bone.

On opening the cranium the dura mater was found somewhat congested and the arachnoid and pia mater much more so; the vessels being engorged with blood. A large clot of extravasated blood was situated just beneath the seat of injury on the frontal bone, and was closely adherent to the dura mater. The anterior lobe of the brain at a point corresponding to this clot was tinted of a greenish hue. There were no signs of pus, and the cerebral substance was healthy.

All the other organs were healthy.

No. 4.—*Poisoning by Datura?* By Assistant Apothecary S. M. TYRRELL, General Hospital, Madras.

GOVINDOO, Maistry, Ordnance Department, aged 39 years.
Coollen, Armourer, Ordnance Department, aged 22 years.
Cutteeamah, mother-in-law of Govindoo, aged 45 years
Seetharam, aged 15 years. } sons of Govindoo.
Rajah, aged 7 years. }
Rungen, male, aged 35 years.

The first two persons were brought to the General Hospital, by Orderlies of the Ordnance Department, at 8-30 A.M. on the 1st November 1866. The four latter were brought about 2 P.M. of the same day, from Chintadrepettah, by Police Peon No. 32, who stated that they had all been poisoned.

History.—A neighbour of the above patients stated that on the previous evening a man and his wife who were lodging in Govindoo's house, gave "a treat" in commemoration of a festival. Rice cakes, curry and abundance of arrack and toddy were served out to the guests who were the above named six persons, and also the wife of Govindoo.

The Maistry and the man Rungen partook very freely of the spirits as well as of the curry and rice and cakes; Coollen, Cutteeamah and the two boys only ate the food; Coollen only partook of a small piece of cake and some curry. After the repast they all became insensible, when the "founders of the feast" decamped, first robbing the maistry of some cloths and his brass utensils.

Condition on admission.—*Govindoo* presented a wild and maniacal appearance. He was very restless, constantly moving to and fro in the ward, resisting the restraining efforts of the orderlies who were put over him, issuing peremptory commands to them, and addressing others by name who were present only in his imagination. He appeared to be busily engaged in his ordinary avocations. His pulse was steady and soft. Tongue stained with betel. Pupils slightly dilated but acting under the stimulus of light.

Coollen was very much less affected than the maistry. His skin was hot, face a little flushed, and pulse quick. No dilatation of the pupils observed. He stated that after having eaten a small quantity of rice-cake and curry he became unconscious of all around him and fell asleep. He awoke about 5 A. M. feeling drowsy and dull, and went to his work, not knowing that he had neglected to dress himself. On arrival at the Arsenal he was sent home to dress as he was in a state of almost complete nudity. He vomited twice and was then sent to Hospital.

Cutteeamah was in a state of great nervous excitement. She occasionally answered imaginary questions in a sudden, starting, ejaculatory manner. She could be made to fix her attention, but replied to direct questions as if frightened. Her pupils were slightly dilated. Pulse steady and soft.

Seetharam was very restless, and so alarmed that he attempted to run away when any one approached him. He had a wild, startled expression, and when questioned kept on muttering "Yes, sar; no sar; what sar." He evidently imagined himself at school and was constantly repeating his lessons in an incoherent manner. He was too frightened and unsteady for his pupils to be examined.

Rajah appeared very intoxicated and in a particularly happy mood. He was frolicsome, and, as he could neither stand nor walk steadily, he tumbled about the ward in a very droll manner. He kept repeating the Tamil alphabet. His pupils were not dilated.

Rungen was in a perfectly helpless state. His limbs were lax and powerless, and he could not stand without support. He was very tremulous and prostrate, and passed urine involuntarily. Every now and then he had a slight convulsive fit, the muscles of the extremities being thrown into clonic spasm. He talked incoherently. His pupils were widely dilated and insensible to light. The pulse was very excited.

Mr. Chipperfield ordered a mustard emetic to be administered to each of the patients. Free effect occurred in all; the ejected matters consisting principally of undigested rice, with some masses of meat and a quantity of greenish tinged vegetable matter. After free emesis had been induced, a dose of scammony and compound jalap powder was given to each patient, producing full purgation.

The next morning, the patients were quite well and were discharged from Hospital, with the exception of Rungen, who was detained until the following day.

The wife of the maistry, who had also partaken of the cake and curry, vomited freely soon after eating, but did not suffer from any of the symptoms which the others presented.

No clue could be obtained to the nature of the poisonous substance which had been administered. From the symptoms alone it is supposed that it was stramonium. A quart bottle was brought containing about an ounce of sour toddy with a small quantity of greyish powder. Under the microscope nothing more was seen than some torula, and some fibre and ducts of vegetable tissue. There was nothing which could lead to the detection of the nature of the seeds which had been used.

The word " poisoning" has been used in the heading of this article, but probably " intoxication" would be more strictly correct.

No. 5.—*Poisoning by Chloride of Zinc.* From the Medical Journal of the General Hospital, Madras. Case reported by Student B. T. Pritchard.

F. B., a Swede, a seaman, 17 years of age. Admitted on the 16th January 1867, complaining of pain in the epigastrium and abdomen, which is increased on palpation, coughing, and moving about. Pulse 76, rather small. Tongue coated with a brownish fur. States that he walked into the Captain's cabin yesterday afternoon and drank three quarters of a tumblerful of fluid which he thought was brandy, but as the taste was acrid he told the Chief Officer, who said it was Disinfecting Fluid, and immediately gave him an emetic, which was repeated as it did not act freely. Upon the Captain becoming acquainted with the circumstance he also administered an emetic, which acted very freely.

A note was at once dispatched to the Captain to enquire what was the nature and quantity of the fluid taken.

To have

Olei Ricini ℥i.

Tinct. Opii ♏x. directly.

Milk Diet. Mutton broth, 1 pint.

17th.—Bowels moved twice this morning. Still complains of pain in the stomach and bowels. No answer from the Captain at present.

18th.—Bowels not moved since yesterday. The pain is less. Tongue foul. Pulse very slow, soft and compressible. The Captain writes to say that the fluid drunk was Sir Wm. Burnett's Solution of Chloride of Zinc. Quantity and degree of dilution not known. The Chief Officer gave emetics of Ipecacuan, but as they did not act freely, the Captain gave 8 grs. of Tartar Emetic, and followed it by warm water until the fluid vomited was quite clear.

19th.—Still has pain in the epigastrium, increased upon taking food. Also has great soreness in the œsophagus, but no difficulty of swallowing, merely a sense of rawness on the passage of anything either solid or fluid. Pulse small, and soft. Tongue clean. Bowels open.

℞. Magnesiæ Carb. grs. xv.
Aquæ Menthæ ℥iss. Thrice daily.
No solid food; milk and broth.

20th.—About the same. Upon examining the throat the tonsils are found enlarged and injected, the fauces also are red. Tongue clean.

Continue.

22nd.—The soreness of the œsophagus is less, but there is still much pain in the epigastrium. Otherwise well.

Continue.

25th.—The pain is lessened. Omit medicine.

Allowed some bread and butter with his slops.

27th.—Was purged thrice yesterday and once last night. Had a few doses of Chalk mixture. Is now much better, and makes no complaint of pain or uneasiness. Says he is very hungry and begs for more food. Throat well. Tongue clean.

Chicken diet.

29th.—Quite well. No pain or diarrhœa. As his Ship is about to sail, he is discharged.

N. B.—It is unfortunate that no information could be obtained as to the probable amount of Chloride of Zinc this lad swallowed. It is presumed that the fluid must have undergone considerable dilution as there were no signs of corrosive action on the mucous membrane of the mouth.

No. 6—Cholera Pills.

Memorandum.

Proceedings of Government, Revenue Department, No. 3211, of 23rd November 1866.

Letter from Native Surgeon M. Iyasawmy, No. 57, dated 8th February 1867.

THE correspondence marginally noted relative to Native Surgeon Iyasawmy's prescription for Cholera Pills is forwarded to the Editor Madras Quarterly Journal for publication, the subject being one of considerable practical interest.

By order,
W. R. CORNISH, Surgeon,
Secretary, Principal Inspector General,
Medical Department.

Office of Prin. Insp. General, Medical Dept.
Fort Saint George, 23rd *February* 1867.

To the Editor Madras Quarterly Journal,

Proceedings of the Madras Government, Revenue Department, 13*th November* 1866.

Read the following Telegrams.

* * *

No. 290.—From Collector, Cuddapah, to Secretary to Government, Fort Saint George, Madras; dated 12th November 1866.

Season continues very encouraging. Crops are all in good condition, no rain this week. Pasturage most abundant. Public health, Cholera almost ceased. I continue to feed from 400 to 500 poor from private funds. The rest as before. A most valuable pill for cholera: Paterson's Pill without the opium, substituting chillies and cantharides. This is Iyasawmy, Native Surgeon's receipt. In this district it has had great success, hundreds have been cured by it. Prices increased on account of a great demand from Bangalore, but not materially.

* * *

No. 300.—*Order thereon*, 13*th November* 1866, *No.* 3083.

1. Ordered that the foregoing telegrams be recorded,

2. Referring to the telegram from Cuddapah, the Collector is requested to obtain and forward the Native Surgeon's prescription, mentioned by him as so successful.

(Signed) J. D. SIM,
Secretary to Government.

Proceedings of the Madras Government, Revenue Department, 23rd November 1866.

No. 573.—Read the following letter from the Collector of Cuddapah, to the Secretary to Government, Revenue Department, Fort St. George; dated Cuddapah, 19th November 1866, No. 42 :—

With reference to the order of Government, dated 13th November 1866, No. 3083, I have the honor to enclose prescription for the Cholera pills, prepared by the Native Surgeon, Iyasawmy, as therein directed.

Prescription for the Cholera Pills.

Plumbi Acetas......	ounces	2	and	scruples	2
Calomelas............	ounce	1	„	scruple	1
Camphor...	„	1	„	„	1
Chilly powder... ...	„	1	„	„	1
Pulv. Cantharides...	„	½	„	„	½
„ Aromatic......	ounces	4	„	scruples	4

Dissolve the Acetate of Lead and Cantharides in two drachms of Acetic acid, the Camphor in some Alcohol, when they are to be rubbed up with the Calomel, Chilly powder and Aromatic powder, with a sufficient quantity of distilled water, and divided into a thousand pills. One or two for a dose.

(Signed) M. IYASAWMY,
Native Surgeon.

Cuddapah, 16th Nov. 1866.

No. 574.—*Order thereon, 23rd November* 1866, *No.* 3211.

Miscellaneous. Communicated to the Officiating Principal Inspector General, Medical Department, for his opinion.

(True extract.)

(Signed) J. GROSE,
Under-Secretary to Government.

Letter No. 57, from Native Surgeon of Cuddapah, to the Deputy Inspector General of Hospitals, Ceded Districts, dated Cuddapah 8th February 1867.

1. With reference to your official Memo, No. 634, dated the 5th instant, accompanying the letter from the Secretary of the Principal Inspector General, Medical Department, to your address, directing me to report as to the utility of the Cholera pills compounded by me, I beg to submit the following remarks thereon.

2. I have been in the habit of using the pills under consideration, for the past three years with much success, both in the Hospital and in my private practice; and when Cholera broke out in the Taluqs last year, I have, at the request of the Collector, issued out nearly 30,000 pills to the various Tahsildars, Police Inspectors and also to some of the Missionaries residing in the districts, for distribution. The reports received from these authorities speak highly of their utility—more than one-half of the cases treated by the pills are said to have been cured.

3. Under my personal observation during the last quarter of the past year, 12 well marked cases were treated in the Hospital with these pills; out of this number 9 recovered. Among the out-patients I attended upon 26 persons, of these 17 got well. The persons brought to the Civil Dispensary for treatment were all, with one or two exceptions, in the last stage of the disease; most of them were cold, pulseless, and with total suppression of the renal secretions; in 5 the cramps were very severe, and in others, this symptom was slight or had ceased before admission.

4. I found the pills to do good both in the incipient and advanced stages of the disease, and in persons of all ages. After administering 4 or 5 pills the kidneys generally begin to act, the clammy, cold perspiration gradually diminishes, and heat returns to the skin. I usually commence the treatment by giving a mustard emetic, and the pills are repeated every hour or after each loose motion. The vomiting is frequently checked by the administration of spirits of camphor (prepared by dissolving camphor in chloroform) 5 or 10 drops on a lump of sugar.

5. Owing to the absence of opium in their composition

these pills can safely be entrusted with any person of ordinary intelligence for administration or distribution.

6. I have abstained from the use of opium inasmuch as I found, after many years' experience, that it has an injurious effect, particularly in the advanced stage of the disease. In the premonitory stage however, the complaint might often be checked by a dose of Chlorodyne or Laudanum, combined with Sulphuric acid, or vegetable astringents. But I may be permitted to say that when the disease is once fully developed, I generally found the use of opium to be attended with danger, either by suddenly suppressing the alvine evacuations and thereby causing tympanitis; or by affecting the head and producing coma.

7. In conclusion,—with reference to that part of your official memo, calling for an explanation of the cause of the delay in submitting the report,—I respectfully beg to state that as the letter of the Secretary of the Principal Inspector General, dated 24th November last, reached me about the end of that month, and as the time for submitting the Annual Report of the Civil Dispensary was close at hand, I was under the impression that it would be sufficient to embody (as I did) in that report full particulars of my personal experience as to the efficacy of the Cholera pills prepared and used by me, without sending in a separate report. I regret to find, however, that I have been mistaken in supposing so, and beg that I might be excused for this remisness.

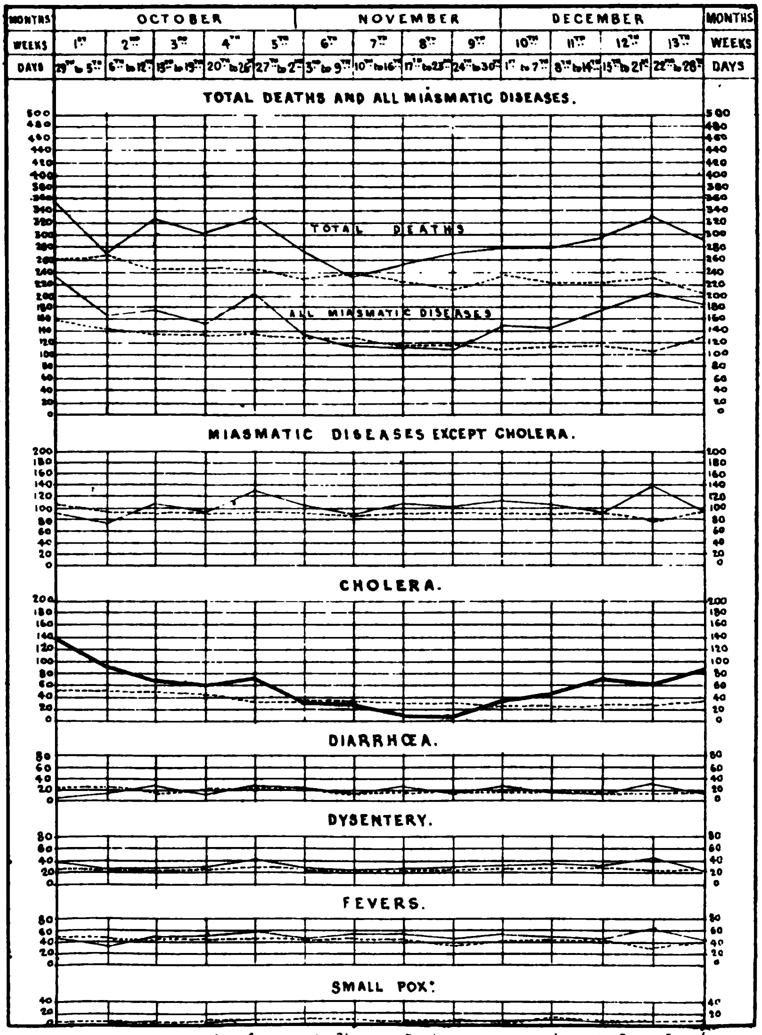
No. 7.—*Report on the Causes of Death in Madras, for the 4th Quarter* 1866. By the Hon'ble R. S. Ellis, C.B., Sanitary Commissioner.

The Fourth Quarter of the past year shows a total mortality in considerable excess over the corresponding quarter of previous years.

The number of deaths has amounted to 3,827, of which 2,079 were from Miasmatic diseases and 1,748 from other causes.

The accompanying diagram will show the wave line of mortality from all causes, and its variations are in general accord with those of deaths from all Miasmatic diseases.

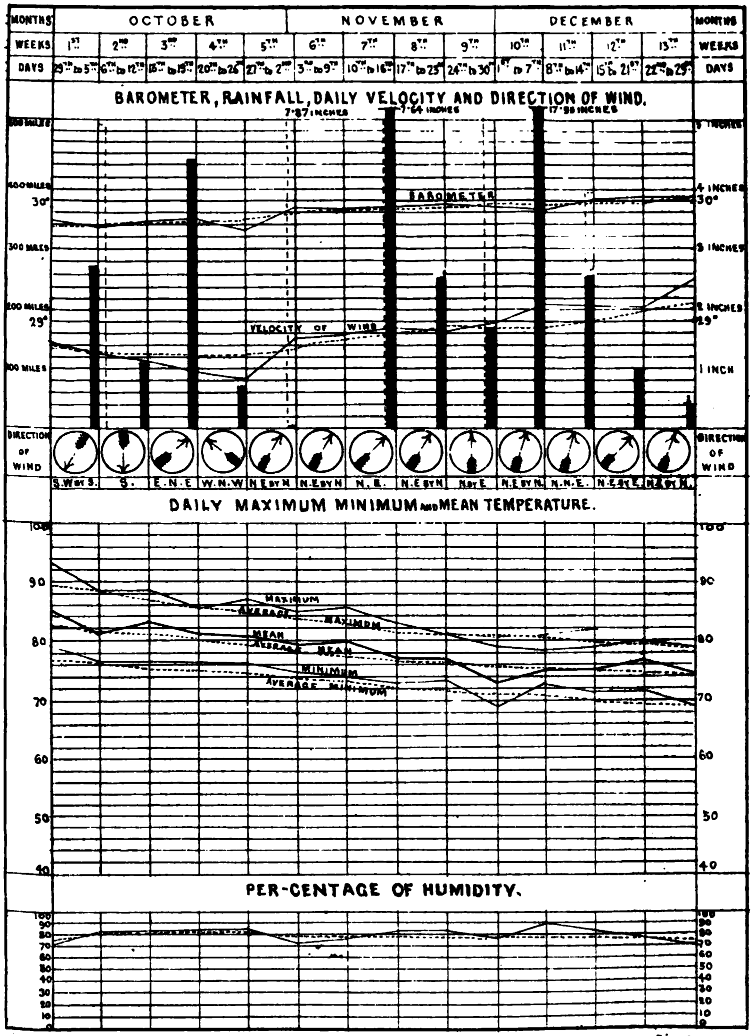
DIAGRAM SHOWING THE DEATHS IN MADRAS FROM ALL CAUSES, MIASMATIC AND SPECIAL MIASMATIC DISEASES DURING THE 4TH QUARTER 1866.



N.B. The total Mortality from each disease during each week is plotted on the perpendicular lines which represent these periods. The horizontal dotted wave lines show the average mortality from each disease for the previous 5 years.

Alexr Barren. lithog. Madras.

DIAGRAM SHOWING THE METEOROLOGICAL CONDITION OF MADRAS DURING THE 4TH QUARTER. 1866.



N.B. The mean weekly Meteorological elements are plotted on the perpendicular lines. The dotted wave lines show the bi-monthly average for twenty years from observations kept at the Madras Observatory.

Alex. Barren, lithog. Madras.

The total number of deaths registered, 3,827, bears unfavourable comparison with the death-rate of the fourth quarter during the five previous years, which averaged 3,085, the maximum rate having been seen in 1862, and the minimum in 1864. There has therefore been an increase of mortality, as compared with similar periods in former years, of 742 deaths.

1861	3.303
1862	4,006
1863	2,629
1864	2412
1865	3,077
Total...	15,427
Average...	3,085

Contrasted with the three preceding quarters of the year as regards mortality from the different classes of diseases, shown marginally, this quarter has been second in amount of mortality from all causes, from Cholera and from all Miasmatic diseases. In these latter two items it shows a considerable improvement upon the preceding quarter which is notoriously unhealthy in all years.

1866.	All Miasmatic Diseases.	Cholera.	All Causes.
1st Quarter...	1,521	321	2,960
2nd do ..	1,469	320	2,926
3rd do ...	2,667	1,655	4,168
4th do ...	2.079	688	3,827

Assuming the population to amount to 4,50,000, the death-rate of this quarter was at an annual rate of 34 per mille.

Among Europeans there were 54 deaths as against an average quarterly mortality of 36·5 during ten years from 1856 to 1865.

There has for the last three years been a steady increase in the rate of mortality of this class of the population. This is no doubt more apparent than real, and is due to an increase in the number of European inhabitants, but the actual mortality to strength cannot be duly estimated without a recent and reliable census. Indeed, this want renders all the calculations in the present Mortuary Reports of doubtful value.

Six cases of death from Cholera occurred among Europeans. One of these was a gentleman who was of advanced age, and another gentleman residing in the same house lost several of his servants from the disease which was prevalent in the immediate neighbourhood of their residence. I directed the attention of the Municipal Commission of Madras to this locality, which is on the great thoroughfare

of Madras, the Mount Road, and they immediately issued orders to have the place properly cleaned and rank vegetation removed. An immediate improvement was observed, and the disease quickly disappeared on the adoption of these measures.

Fever proved fatal to Europeans in six cases, Dysentery in five, and Diarrhœa in four instances; these three figures being almost identical with the experience of 1865 during the same quarter.

Attention was drawn in last Quarterly Report to the number of deaths among European children from July to September; in the present quarter the mortality among European children declined considerably.

Twenty-one deaths occurred among children of Civil and Military Europeans, and of the adult population who died, 22 were Civil and 11 Military, of the former nine were women. The deaths among Military occurred among males only.

Among East Indians, the death-rate has been extremely high, being about double that of the concluding quarters of 1864 and 1865, and 50 per cent. more than the average of the five preceding years. The actual number of deaths was 127, while the average mortality of the fourth quarters of ten years was only 65·6.

Twenty deaths were from Cholera, a number slightly in excess of the annual average of the last five years, but this latter is high in consequence of an unusual mortality from this disease in 1862, when 63 persons died of it. One fatal case of small pox occurred : this is the first witnessed during the fourth quarters of the past five years. Fevers, Dysentery and Diarrhœa also show a slight increase upon the experience of previous years.

The death-rate from non-miasmatic diseases were 67 as against a quinquennial quarterly average of 46·6.

Among Hindoos 3,042 deaths occurred, being considerably in excess (20 per cent.) of the quinquennial average, and 50 per cent. more than during the corresponding period in 1865. The death-rate from Cholera is high (530) as compared with the quinquennial average (391). But Diarrhœa, Dysentery and Fevers were not unusually fatal, although the distress of the lower orders during the period under

notice would have accounted for a large fatality from bowel complaints.

Among Mahomedans the total deaths (601) were much in excess of the quinquennial average 402, and of the fourth quarters of 1863-1865, when totals of only 324, 315 and 363 were recorded. The deaths from Cholera were 132, of whom 70 were females. The quinquennial average is only 54·8, and the increase in Fevers, Dysentery and Diarrhœa was considerable.

It is not improbable that among this portion of the community, the distress arising from the high price of all articles of food was more severely felt than among the Hindoo population. Their occupations are more restricted, and they are as a rule less industrious than the Hindoos.

The deaths from Fever were 662 in number. Those in the three preceding quarters were 541, 553 and 500. The fourth quarter is therefore the highest, and considerably above the quinquennial average which held good through the rest of the year.

Fevers.

1861	585
1862	569
1863	512
1864	493
1865	624
Total...	2,783
Average...	556·6

During the quarter the wave line of deaths from this cause was below the average only during the first two weeks, from which time it was always above, and in the twelfth week very considerably above it. The fourth and twelfth weeks were the most fatal, and the range of the disease ran between 40 and 60 deaths, with general evenness.

The total deaths from Small-pox were 12 which bears a favourable comparison with 35·4 which is the average of five preceding years.

The disease was entirely absent in the first, third, fifth, sixth seventh and twelfth weeks. The highest mortality was in the second week (3). During the other six weeks when the disease was fatal, the cases were equally two and one per week. During the previous quarters of the year, the deaths were consecutively 28, 34 and 29, so that in this respect the health of Madras was much improved.

Small-pox.

1861	126
1862	17
1863	19
1864	3
1865	12
Total...	177
Average...	35·4

The deaths from Dysentery are 409, being 90 above the quinquennial average. The numbers in the three preceding quarters were 337, 287 and 285. Except in the first week the range of mortality from this disease was above the average of the preceding years, and as shown in the diagram the progress of the disease and its relative intensity kept pace almost exactly with that of Fevers. Each of these classes reached their culminating points in the fourth and twelfth weeks, and each in the twelfth week showed the greatest excess over the average of previous fourth quarters. It ought however to be borne in mind that a good deal of rain had fallen, that the thermometer had reached its lowest point of maximum heat at the end of the tenth week, and of minimum heat a week earlier, and that the percentage of humidity had also reached its maximum during the quarter. These atmospheric conditions may be considered as influencing the public health, and in some measure accounting for the high mortality rate shown by this disease.

Dysentery.

1861	361
1862	305
1863	300
1864	252
1865	375
Total...	1,593
Average...	318·6

283 deaths from Diarrhœa occurred during the fourth quarter, being only 16 in excess of those recorded in the first quarter of the year. In the second quarter 225, and in the third 172 were recorded. The death-rate was slightly in excess of that observed during corresponding quarters in previous years, and this excess is probably due to the atmospheric influences noticed under the head of Fevers and Dysentery. Diarrhœa was most fatal during the twelfth week, and generally the range and intensity of the disease was proportionate to, but lower than, Dysentery.

Diarrhœa.

1861	253
1862	288
1863	236
1864	217
1865	286
Total...	280
Average...	256·0

As before shown Cholera bears a high proportion to the total deaths from all Miasmatic diseases, and during this quarter it has tended very considerably to increase this proportion. 688 cases occurred as against a quinquennial average of 466·0, and this latter number is much in advance of

Cholera.

1861	614
1862	1,341
1863	133
1864	34
1865	208
Total...	2,330
Average...	466·0

that shown in 1864-65. During the first four weeks the rate was high (91, 70, 61, 71), in the next four weeks it rapidly declined, and for the next three rose slowly. A slight fall occurred in the twelfth week, and a rapid and considerable increase occurred in the concluding week of the quarter.

Of the several divisions of the town the 7th shows the highest total mortality, the 1st Division stands lowest, although embracing Black Town within its limits. The different localities in the Police Divisions were very unequally affected. Triplicane, Royapooram, Peddoo Naik's Pettah, and Cashemode—all suffered severely. One case of the disease occurred in Fort St. George in the quarters occupied by the Band. These quarters are ill-ventilated and close to the Fort Ditch.

The accompanying Chart will sufficiently explain the Meteorological condition of Madras during the past quarter.

Barometer.

The Barometer showed an average mean atmospheric pressure of 29·926 reduced to 32°F., and the weekly registers show that the rise and fall differed slightly from those of previous years. In them an average pressure of 29·918 was observed. A slight fall occurred in the fourth week and a corresponding rise in the following one; the Barometer then followed the average line until the tenth week, when it slightly fell, and rising very slightly during the two weeks next following it became again almost identical with the average height.

Thermometer.

The mean maximum temperature averaged above that of the previous 20 years, in which it was recorded. During the tenth and eleventh weeks (when heavy rain fell) the maximum temperature was *below* the average.

The mean temperature was ·7° above the 20 years average; in this respect being much closer to the average than in the previous quarter, when it was 2 degrees above the average.

The mean maximum temperature of the thirteen weeks noted was 83·9, and the mean minimum 73·3, the former being ·7 and the latter ·8 above the average.

Velocity and direction of the wind.

In this respect a much greater variation from previous results was shown. In the first four weeks a fall from 140 to 83 miles took place; in the fifth week a rapid rise occurred (from 83 to 157). During the following four weeks, the velocity of the wind continued high, and in the tenth week rose to 211 miles, slightly falling (to 200 miles) in the eleventh and twelfth weeks; it rose rapidly in the concluding week of the quarter when it reached its maximum of 250.

The direction of the wind was generally from N. and N. E. as was to be expected during the prevalence of the N. E. monsoon.

Humidity.

The percentage of humidity has been nearly identical with that of previous years. It has however at its maximum and minimum points shown an unusual range of difference amounting to 20. The dates of these maximum and minimum points correspond accurately with the tenth week, one of unusual rain, and the other with the fifth week in which usually rain falls, although no rain fell during this period in 1866.

Rain-fall.

The rain-fall amounted to 42·58 inches in the thirteen weeks as against an average of 31·06 from 1st March 1841 to 28th February 1861, and of 28·52 during a total of 58 years.

The increasing rate of mortality in Madras from Miasmatic disease, the intensity of which is due to the unfavourable sanitary condition of the town may, I trust, plead my excuse for urging upon the Government an early consideration of the project for a comprehensive scheme of drainage—which has been submitted to them by Captain Tulloch. Until the present and imperfect drains are replaced by a complete system of drainage, and until pure drinking water is available to the poorer classes, the Mortuary Returns will continue as at present to show an increasing death-rate. This high mortality, which falls in the first instance on the poorest classes, re-acts on all classes by the spread of epidemic diseases of which one, cholera, threatens to become endemic in Madras.

Table showing the mortality from Miasmatic Diseases in the last 13 weeks.

	Oct. 5	Oct. 12	Oct. 19	Oct. 26	Nov. 2	Nov. 9	Nov. 16	Nov. 23	Nov. 30	Dec. 7	Dec. 14	Dec. 21	Dec. 28	Total.
Fevers	34	51	52	60	47	54	55	48	54	50	44	61	44	654
Diarrhœa	19	23	15	27	25	17	21	18	22	19	16	31	19	272
Dysentery	25	27	29	40	31	21	25	30	31	34	32	44	28	397
Small Pox	...	3	...	1	...	...	...	1	2	2	1	2	...	12
Cholera	91	70	61	71	34	26	10	10	38	45	73	65	88	682
Other Miasmatic Diseases	...	2	...	2	1	...	2	3	2	1	2	1	8	24
Total...	169	176	157	201	138	118	113	110	149	151	168	204	187	2,041

Average of the corresponding weeks for 5 previous years.

Fevers...	41·0	42·6	41·2	45·0	41·6	42·4	41·0	39·8	40·0	45·2	42·4	36·6	42·6	541·4
Diarrhœa...	24·0	19·8	20·0	22·2	26·0	17·8	18·2	19·4	16·0	15·8	18·4	17·2	19 0	250·8
Dysentery	26·0	25·4	23·4	26·2	24·6	22·8	22·8	24·6	26·0	24·4	25 4	21·2	21·2	314·0
Small Pox...	2·8	1·8	3·0	1·4	2·2	3·0	3·6	3·0	1·6	3·0	2·4	2·4	5·4	35·6
Cholera...	49·2	48·0	41·0	37·8	36·8	35·8	28·0	30·4	24·6	21·6	27·2	28·8	38·4	447·6
Other Miasmatic Diseases	2·4	1·6	3·0	2·0	2·0	3·8	2·2	2·6	3·0	3·8	4·0	1·6	1·0	33·0
Total...	145·4	139·2	131·6	134·6	130·2	125·6	115·8	119·8	111·2	113·8	119·8	107·8	127·6	1622·4

Mean Meteorological Observations for the past 13 weeks.

	Oct. 5	Oct. 12	Oct. 19	Oct. 26	Nov. 2	Nov. 9	Nov. 16	Nov. 23	Nov. 30	Dec. 7	Dec. 14	Dec. 21	Dec. 28	Average.
Barometer reduced to 32° F.	29·771	29·834	29·866	29·770	29·921	29·925	29·950	29·983	29·958	29·913	30·016	30·073	30·062	29·926
Mean Maximum Temperature	88·5	88·3	85 6	86·8	85·0	85·9	82·4	81·3	79·1	78·3	78·9	80·0	79·0	83·0
Do. Minimum do.	76·6	76·5	76·4	76·0	74·2	74·0	73·1	73·3	68·8	72·1	71·7	71·8	69·4	73 3
Mean Temperature	81·8	82·5	80·7	80·2	79·6	80·0	77·5	77·4	73·8	74·9	74·8	76·2	74·4	77·9
Mean Humidity...	81	82	84	84	78	77	81	83	78	90	88	76	69	80 0
Prevailing Wind	S. W. by S.	S	E.N.E.	W. N. W	N. E. by N.	N. E. by N.	N. E.	N. E. by N.	N. by E.	N. E. by N.	N. N. E.	N. E. by E.	N. E. by N.	N. E. by N.
Mean Velocity in Miles ...	127	116	92	83	157	161	169	160	174	211	204	201	250	161·9
Rain fall...	2·71	1·02	4·42	0·62	0·08	...	7 64	2·55	1·74	17·95	2·59	0·89	0·37	3·54

Table showing the Mean Half Monthly Meterological condition of Madras for 20 years from 1st March 1841 to 28th February 1861.

	Half month ending 15th October.	Half month ending 31st October.	Half month ending 15th November.	Half month ending 30th November.	Half month ending 15th December.	Half month ending 31st December.	Average.
Barometer reduced to 32° F........	29·822	29·873	29 914	29·950	29·957	29·996	29·918
Mean Maximum Temperature......	86·5	84·2	82·3	81·1	80·1	79·5	82·3
Do. Minimum do.	75·9	74·3	73·1	71·7	70·8	69·5	72·5
Do. Temperature...	80·8	79.0	77·6	76·2	75·3	74·5	77·2
Do. Humidity...	81	82	77	78	79	76	78
Prevailing Wind....	S. by E.	N. E.	N. N. E.	N. N. E.	N. N. E.	N. N. E.	N. N. E.
Mean Velocity in Miles*...... ...	120	126	145	175	171	189	154·3
Rain fall..	5·08	7·87	6·28	5·52	3·98	2·33	5·17
Do. 58 years ½ monthly average.	4·66	7·23	5·77	5·07	3·65	2·14	4·75

* Average of 6 years only (1861 to 1866.)

Deaths in Madras, Fourth Quarter of 1866.

	European.		East Indian.		Hindoos.		Mahomedans.		Total.		General.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Miasmatic Diseases.											
Small-Pox	...	...	...	1	5	5	...	1	5	7	12
Fevers	5	1	6	12	284	280	31	43	326	336	662
Dysentery	4	2	5	3	177	160	24	34	210	199	409
Diarrhœa	3	1	8	4	113	122	11	21	135	48	283
Cholera	4	2	11	9	266	264	60	72	341	347	688
Other Miasmatic diseases ...	2	1	1	...	9	8	4	...	16	9	25
Total Miasmatic...	18	7	31	29	854	839	130	171	1,033	1,046	2,079
Total of all other diseases...	17	12	37	30	774	575	161	142	989	759	1,748
Total...	35	19	68	50	1,628	1,414	291	313	2,022	1,805	3,827
—	54		127		3,042		604		3,827		
Mean Mortality of ten fourth quarters from 1856 to 1865.											
Miasmatic diseases	10·3	3·0	14·2	13·3	605·5	569·7	78·6	84·7	708·6	670·7	1379·3
Other diseases	16·7	6·5	20·2	17·9	577·1	476·1	97·0	97·3	711·0	597·8	1308·8
Total...	27·0	9·5	34·4	31·2	1182·6	1045·8	175·6	182·0	1419·6	1268·5	2688·1
	36.5		65·6		2228·4		357·6		2688.0		
Increase	17·5		61·4		813·6		246·4		...		1138·9
Decrease	..		...		...		...		...		...

METEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of October* 1866.

October 1866.	Barometer reduced to 32°.	Standard Thermometers. Observed extremes. Maxim.	Standard Thermometers. Observed extremes. Minim.	Standard Thermometers. Daily means. Dry.	Standard Thermometers. Daily means. Wet.	Percentage of Humidity.	Wind. Prevailing direction.	Wind. Daily velocity.	Depth of Rain.	GENERAL REMARKS.
	Inches	°	°	°	°	per cent.		Mls.	Ins.	
1	29·686	86·6	72·8	80·3	75·1	79	W. by S.	155	1·03	Rain from 1½ to 5½ A. M. Day, chiefly overcast. Shower at 10½ [P. M.
2	29·713	89·0	77·1	82·8	77·7	80	S.	180	....	Cloudy and hazy.
3	29·817	88·2	76·3	82·1	77·9	83	S. S. E.	126	0·61	Rain from 1½ to 4 A. M. Day, chiefly overcast. Shower at midnight.
4	29·853	80·6	75·7	78·0	75·8	90	W. N. W.	49	0·92	Rain from 2½ A. M. to 3 P. M.
5	29·829	86·0	75·8	79·6	76·6	87	S. by W.	70	....	Cloudy.
6	29·827	87·2	76·5	82·4	78·3	84	S. S. W.	84	0·29	Passing clouds. Rain at 11 P. M.
7	29·822	89·1	72·8	80·7	78·2	90	S. S. W.	140	0·71	Heavy thunder storm at 3 A. M. Rain until 5 A. M. Passing clds.
8	29·845	88·4	77·3	82·1	77·5	82	S. by E.	133	0.02	Chiefly fine. Shower at 1½ P. M.
9	29·861	89·2	78·0	82·5	78·2	83	S. by E.	126	....	Passing clouds.
10	29·801	89·1	77·0	83·4	77·8	78	S. by E.	130	....	Fine day; cloudy night.
11	29·813	87·1	75·1	82·9	77·5	79	S by W	106	....	Chiefly fine.
12	29·868	87·8	78·1	83·6	77·8	78	S. E.	91	.....	Fine, with passing clouds.
13	29·887	87·7	77·4	82·2	77·2	80	E.	67	....	Chiefly overcast.
14	29·866	85·6	75·9	81·2	77·3	84	E.	80	1·66	Light rain from 3½ to 7½ A. M. Fine day.
15	29·835	85·6	77·0	81·1	77·6	86	S. E by E.	77	0·95	Fine sky with heavy passing clds Rain at 10½ A. M. and 10 to 12 PM
16	29·842	86·7	77·2	81·2	76·6	82	E. by S	96	0·24	Passing clouds and showers
17	29·862	86·0	76·5	81·0	77·3	85	N. E. by N	109	0·81	Chiefly cloudy. Rain at 5½ A. M. and 11½ P. M.
18	29·893	82·9	75·2	79·9	76·2	85	N. by W.	99	0·76	Rain till 4 A. M. Chiefly overcast
19	29·877	84·8	75·8	78·0	75·4	89	N. by E.	114	.....	Chiefly overcast.
20	29·866	80·4	75·5	77·3	74·9	89	N. N. W.	69	0·06	Light showers. Overcast.
21	29·796	86·7	75·8	80·1	77·1	88	NWbyN.	65	....	Overcast.
22	29·732	87·8	76·6	80·7	75·7	80	N. by W.	80	0·03	Chiefly overcast.
23	29·677	87·5	74·2	79·7	76·7	87	SW by S.	92	0·47	Rain till 1½ A. M. Chiefly overcast. Showers again at evening.
24	29·689	86·6	76·3	80·7	75·7	80	NWbyW	98	....	Chiefly cloudy.
25	29·754	90·1	76·1	82·3	76·9	79	N.	89	....	Passing clouds.
26	29·876	88·4	77·2	80·4	75·9	82	S. E.	89	0·06	Fine with passing clouds. Shower at 5 P. M.
27	29·917	87·9	75·7	80·7	74·5	75	E. by S.	70	....	Chiefly fine.
28	29·929	93·9	74·6	80·8	75·3	78	N EbyN.	166	......	Chiefly fine.
29	29·926	84·6	76·5	80·1	73·8	75	N. EbyN.	189	0·08	Showery morning. Passing clds.
30	29·928	84·9	76·1	80·8	72·9	69	N. EbyN.	186	....	Passing clouds
31	29·940	84·5	73·2	78·7	71·3	70	N. N. E.	136	....	Fine, with passing clouds.

The Standard Barometer and Thermometers are read at 10 A. M., 4 P. M. and 10 P. M. and the Daily Means are obtained by the application of hourly corrections, deduced from twenty years' observations. The Cistern of the Barometer is 27 feet above the level of the Sea, and the Receiver of the Rain-gauge is three feet from the ground. The Wind and Rain registered are for the current civil day—from midnight to midnight.

N. R. POGSON, *Government Astronomer.*

METEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of November*, 1866.

November 1866.	Barometer reduced to 32°.	Standard Thermometers. Observed extremes. Maxim.	Standard Thermometers. Observed extremes. Minim.	Standard Thermometers. Daily means. Dry.	Standard Thermometers. Daily means. Wet.	Percentage of Humidity.	Wind. Prevailing direction.	Wind. Daily velocity.	Depth of Rain.	GENERAL REMARKS.
	Inches.	°	°	°	°	per cent.		Mls.	Ins.	
1	29·912	84·7	71·9	77·9	70·1	69	N. N. E.	168	.....	Fine, with passing clouds.
2	29·626	94·4	71·7	78·2	72·0	73	N. by E.	181	....	Cloudy.
3	29·948	84·7	72·7	77·5	71·3	74	N.E byN.	149	....	Passing clouds.
4	29·972	85·7	71·7	79·6	75·4	82	N.E.byN.	154	.....	Fine, with passing clouds.
5	29·952	86·1	75·8	80·5	75·5	80	N. N. E.	162	....	Passing clouds.
6	29·918	85·5	75·7	80·5	74·5	76	N.E.byN.	161	.....	Passing clouds. Fine night.
7	29·903	86·8	75·1	80·8	75·3	78	N.E byN.	165	.. ....	Passing clouds. Fine night.
8	29·889	86·2	75·0	80·5	74·0	74	N E byN	174	....	Fine.
9	29·895	86·1	72·2	80·3	73·7	74	N.E.byN.	164	....	Fine.
10	29·896	84·5	72·8	79·7	73·4	75	N. E.	137	.....	Fine day : passing clouds at night.
11	29·913	83·5	73·4	75·2	72·0	86	N. E.	88	0·53	Rain about 10 A. M. Chiefly cloudy.
12	29·963	84·0	73·3	79·7	72·9	73	N.E.by E.	130	....	Fine, with passing clouds.
13	29·974	84·3	72·8	79·7	73·0	73	N.E byN.	205	.....	Passing clouds.
14	29·935	84·7	73·5	79·0	71·7	71	N. N. E	229	....	Passing clouds.
15	29·939	81·5	73·6	75·6	74·3	94	N.E byN.	215	2·80	Overcast. Rain from 2¾ to 3½ A.M. ; light ditto from 8 A.M. to noon : heavy ditto after 7½ P.M.
16	29·030	74·6	72·5	73·3	71·9	93	N.E byE.	178	4·31	Overcast & rainy nearly all day.
17	29·024	80·0	72·8	78·0	73·6	81	N. N. E.	186	0·19	Overcast. Rain about noon.
18	29·989	82·1	72·7	77·6	73·9	84	N. by E.	164	....	Passing clouds.
19	29·990	83·0	73·5	77·6	74·4	86	N. N. E.	133	0·05	Showers before 6 A. M. Passing Clouds.
20	29·989	82·4	73·7	77·6	73·6	83	N.E.byN.	152	0·46	Rain at 5 A. M. and 10 P. M. Passing clouds.
21	29·975	80·0	73·8	77·6	73·5	83	N. N. E.	130	1·29	Chiefly cloudy. Rain from 11½ A. M. to 1 P. M.
22	29·968	80·4	73·0	76·3	72·4	83	N.E.byN.	172	....	Passing clouds.
23	29·945	81·2	73·6	77·0	72·2	80	N.E.by E.	186	0·56	Chiefly overcast. Rain after 10 A. M.
24	29·967	76·2	71·5	72·4	70·9	93	N. by E.	144	1·58	Steady rain nearly all day.
25	29·991	77·7	71·0	74·3	70·2	83	N. by E.	155	0·16	Light rain until sunrise. Overcast.
26	29·951	80·4	66·5	72·7	65·0	67	N. N. E.	157	....	Fine.
27	29·934	79·9	63·1	71·5	64·0	67	N. by E.	123	....	Chiefly fine.
28	29·946	79·8	66·4	73·5	67·4	74	N. N. E.	199	......	Fine, with passing clouds.
29	29·965	79·9	70·8	74·8	69·6	77	N.	228	....	Overcast.
30	29·949	80·0	72·0	77·2	73·0	82	N. by E.	215	....	Chiefly overcast.

The Standard Barometer and Thermometers are read at 10 A.M., 4 P.M. and 10 P.M., and the Daily Means are obtained by the application of hourly corrections, deduced from twenty years' observations. The Cistern of the Barometer is 27 feet above the level of the Sea, and the Receiver of the Rain-gauge is three feet from the ground. The Wind and Rain registered are for the current civil day—from midnight to midnight.

N. R. POGSON, *Government Astronomer.*

METEOROLOGICAL RESULTS *from the Madras Observatory Register, for the month of December,* 1866.

December 1866.	Barometer reduced to 32°.	Standard Thermometers. Observed extremes. Maxim.	Minim.	Daily means. Dry.	Wet.	Percentage of Humidity.	Wind. Prevailing direction.	Daily velocity.	Depth of Rain.	GENERAL REMARKS.
	Inches.	°	°	°	°			Mls.	Ins.	
1	29·940	80·6	73·5	75·6	69·8	76	N. N. E	292	0·14	Overcast. Showers after 5 P.M.
2	29·903	72·4	68·3	70·0	68·7	94	N. N. W	244	2·16	Overcast with frequent rain.
3	29·889	76·3	70·4	73·9	73·3	98	N. N. E.	274	4·97	Steady rain nearly all day.
4	29·881	80·3	73·8	76·0	74·2	92	N.E.byE.	256	2·13	Light rain before noon. Heavy from 5 to 7 P.M.
5	29·925	75·9	73·0	75·1	73·5	93	N.E.byE.	153	7.99	Very heavy rain before 5 A.M. Day overcast.
6	29·890	81·4	72·7	76·5	74·7	92	N. E.	123	0.33	Showers before 7 A.M. Chiefly cloudy.
7	29·964	81·4	72·8	77·0	74·3	88	E. by N.	125	0.23	Showers before 6 A.M. and at 5-30 P.M. Passing clouds.
8	30·004	80·9	73·1	77·3	72·9	81	N.E.byN	232	1·46	Rain until 4 A.M. Passing clouds.
9	30·022	78·9	72·5	75·0	67·3	68	N.E.byN	225	....	Fine, with passing clouds.
10	30·044	77·4	69·0	74·1	68·9	77	N.	227	....	Passing clouds.
11	30·048	77·8	69·6	73·4	71·0	89	N.	240	0·20	Cloudy. Rain after 9 P.M.
12	30·022	80·3	72·8	74·1	73·2	95	N. N. E.	171	0.21	Light showers before 11 A.M.
13	29·990	77·3	73·4	74·5	71·6	87	N. N. E.	166	0·39	Overcast. Rain from 6 to 8 A.M.
14	29·985	89·0	71·6	75·2	70·6	81	N. by E.	164	0.33	Rain from 6 to 9 A.M. Overcast.
15	30·034	80·6	74·0	77·4	71·3	75	N.E.byN	191	....	Cloudy.
16	30·081	80·3	73·1	77·1	70·7	73	N.E.byN	212	....	Chiefly overcast.
17	30·084	80·2	71·9	75·0	69·2	75	N.E.byE.	209	....	Fine, with passing clouds.
18	30·082	80·1	69·2	75·4	69·6	76	E. N. E.	121	....	Chiefly fine.
19	30·078	79·5	68·1	75·3	70·1	78	N.E.byE.	153	0·05	Passing clouds. Shower at 8 A.M.
20	30·073	81·0	73·6	76·9	71·8	70	N. E.	252	0·27	Showers before 9 A.M. Passing clouds.
21	30·082	78·5	72·8	76·0	70·4	77	E. by N.	266	0·57	Rain before 1 P.M. Overcast.
22	30·088	79·7	72·5	75·4	68·0	69	N. E.	276	....	Passing clouds.
23	30·085	79·6	67·1	75·0	68·0	71	N.E.byN	222	....	Passing clouds.
24	30·096	79·8	70·2	75·5	68.3	70	N. E.	338	0·29	Showers between 2 and 4 A.M. Passing clouds
25	30·089	79·3	71·4	75·4	66·5	63	N. E.	308	0·08	Showers between 1½ and 4 A.M. Passing Clouds.
26	30·061	78·5	69·7	74·6	66·9	68	N. N. E.	239	....	Chiefly fine.
27	30·013	77·7	67·3	72·6	65·3	69	N. by E.	204	....	Chiefly fine.
28	30·001	78·4	67·3	72·5	66·0	72	N. by E.	165	....	Fine.
29	29·978	80·2	67·7	72·9	68·9	82	N. N. E.	168	....	Passing clouds.
30	29·934	79·3	71·8	75·4	69·8	77	N. E.	148	....	Chiefly overcast.
31	29·960	80·7	68·5	75·0	70·1	79	N.E.byE	164	....	Fine, with passing clouds.

The Standard Barometer and Thermometers are read at 10 A. M., 4 P. M. and 10 P. M., and the Daily Means are obtained by the application of hourly corrections, deduced from twenty years' observations. The Cistern of the Barometer is 27 feet above the level of the Sea, and the Receiver of the Rain-gauge is three feet from the ground. The Wind and Rain registered are for the current civil day—from midnight to midnight.

N. R. POGSON, *Government Astronomer.*

PART IV.

MEDICAL INTELLIGENCE.

Annual Report of the Madras Medical College, 1865-66.

1. The Session.

THE academical year of 1865-66 terminates to-day. It commenced on the 2nd of October 1865, and has consisted of a Winter Session of six and a Summer Session of three months' duration. The Winter Session terminated on the 29th of March, and the Summer Session commenced on the 3rd of April 1866.

2. College Staff.

Important changes have taken place in the College Staff since the date of last report (31st May 1865). Dr. Montgomery's connection with the College as Professor of Botany, &c., ceased on the 31st of July last. He had held his Professorship for 8 years, and was an able, zealous, and successful teacher. Dr. Bidie, his successor, assumed charge of his duties on the 25th September 1865. Mr. Blacklock left Madras on the 29th of August last, on sick certificate, and Mr. Chipperfield was appointed to act in his room as Professor of Medicine and Clinical Medicine. Dr. Aitken, Professor of Midwifery, &c., embarked for England on the 29th of August, having obtained furlough on sick certificate. His departure occasioned a permanent vacancy in the College Staff, which was filled up by the appointment of Dr. Harris, who assumed charge of his duties on the 29th of September 1865. Dr. Aitken, though connected with the College but one Session, had proved himself to be a practical and efficient teacher. Mr. Furnell, the acting Professor of Anatomy and Physiology, relieved Assistant Surgeon Æ. M. Ross on the 3rd of October last. Mr. Ross officiated in the appointment from the 25th of August to the 3rd of October 1865. These changes in the constitution of the College Staff

taking place, as they did, close upon the commencement of the present academic year, caused no little anxiety to the educational authorities. To lose, suddenly, experienced teachers of such subjects as medicine, midwifery, materia medica, anatomy and physiology, would have proved, at any time, a severe trial to the College, but to lose them just when new and untried changes had been effected in the arrangement of the Instition, was equivalent to placing the working of the College to signal disadvantage. The danger of the situation, however, has been tided over satisfactorily by the zeal and energy of all connected with the Institution. No changes have taken place among the Assistants since last report, except that the services of Mr. Watkins, the English teacher, have been dispensed with, in consequence of the alterations effected in the College arrangements under the order of Government, dated 29th March 1865.

3. Additional Courses.

In order to meet the requirements of the Madras University regulations, for candidates for degrees in medicine, &c., a course of lectures on Hygiene was delivered by Dr. Urquhart during the Winter Session, and a course of lectures on Comparative Anatomy by Mr. Chipperfield during the Summer Session.

4. Changes in the several curricula.

At the commencement of the academic year, considerable changes took place in the curricula of the three departments of which this Institution is composed, in consequence of the order of Government No. 84, dated 29th March 1865. The curriculum of the Senior Department was re-modelled to correspond with the requirements of the University, and the curricula of the Second and Junior Departments were re-cast to meet the sanctioned recommendations of a Committee, whose report on the working of the Medical College is dated 2nd December 1864.

5. Lectures, Examinations, &c.

The following table exhibiting the number of lectures delivered, the number of examinations held, and the proportion of examinations to lectures in each course during the past Winter and Summer Sessions, has been drawn up from the annual reports of the several Professors. As these reports are entered in full in the appendix, it will only be necessary to notice, in this place, any special

points which may have been touched upon by the several Professors.

Session.	Subject of Course.	No. of Meetings.	Number of Lectures delivered.	No. of Examinations held.	Proportion of Examinations to total number of Meetings.
Winter....	Medicine.	118	76	42	1 in $2\frac{17}{21}$
	Surgery	118	82	36	1 in $3\frac{5}{18}$
	Ophthalmology..	48	32	16	1 in 3
	Midwifery	112	65	47	1 in $2\frac{18}{47}$
	Chemistry.	120	76	44	1 in $2\frac{8}{11}$
	Medical Jurisprudence......	70	47	23	1 in $3\frac{1}{23}$
	Hygiene..	42	27	15	1 in $2\frac{4}{5}$
	Physiology	115	79	36	1 in $3\frac{7}{36}$
	Materia Medica	120	66	54	1 in $2\frac{6}{27}$
Winter & Summer.	Anatomy..	172	110	62	1 in $2\frac{24}{31}$
Summer..	Botany	41	35	6	1 in $6\frac{5}{6}$
	Diseases of Women and Children..........	68	52	16	1 in $4\frac{1}{4}$
	Organic Chemistry	29	22	7	1 in $4\frac{1}{7}$
	Comparative Anatomy......	44	30	14	1 in $3\frac{1}{7}$

Dr. Paul observes, "one great defect pervades this Department, Senior as well as Junior, (1st and 2nd Class 2nd Department students) the very imperfect knowledge of English possessed by its members and the untrained state of their minds. They have been all taken too soon from school, they are now being taught a difficult science at a time when they should be studying the rudiments of education, and, more especially the channel by which they alone can acquire knowledge, the practical use of the English language; many of them have a difficulty of comprehending what is said to them in lectures, or what is written in their text books, and still more in expressing their own thoughts orally or in writing."

One great difficulty in the way of these students comprehending readily the lectures delivered, depends upon the necessary use by the teachers of technical and scientific terms. The lads in College of the Second and Junior Departments, having had no preliminary hospital training, have missed the advantages secured to their successors of a two years' familiarity with the technical language of the Hospital and Dispensary. The standard of English demanded of candidates for the Second Department has recently been determined by Government, it is very necessary that standard should not be lowered.

Dr. Paul again remarks,—

"Considerable inconvenience was felt in the Clinical Class from the frequent absence of the members attending the dissecting and dispensing rooms. From the limited number of students it frequently happened that the students in charge of the new cases were absent on one or other of these duties, and consequently the cases could not be read, and the proper business of the morning, as it were, deferred till the morrow." In his report on the courses of Operative and Minor Surgery, Dr. Paul repeats his remarks.

The inconvenience complained of by Professor Paul undoubtedly exists, but it can be remedied only to a very slight extent. The only hours of the day which can be set aside for Practical Anatomy are the morning hours from 6 to 10 A. M. Every other arrangement which involves the prosecution of that most essential study during the College hours, namely, from 10 A. M. to 4 P. M., has signally failed. It is therefore a necessity that students detailed for Practical Anatomy should, for the time being, be excused attendance at Hospital. Practical Anatomy, however, is confined to the Winter Session, whilst Clinical teaching is continued throughout both Winter and Summer Sessions, and the average number of mornings, during which a student will be absent from his clinical course, in consequence of attendance at the dissecting room, will not exceed twenty in the whole period of 9 months.

Again, with reference to the absence, once in seven days, of students from their Clinical studies, to gain practical experience in the compounding and dispensing of medicines, it seems impossible to remove, in any great measure, this inconvenience, consistently with maintaining intact the

great principle which may be succinctly expressed thus; *Practical experience in a Hospital Dispensary is the necessary complement of courses of Practical Pharmacy attended in College.* The latter can never act as a substitute for the former.

Dr. Harris, the Professor of Midwifery, states that "Practical instruction in Midwifery at the bedside has been afforded to all the students in rotation at the Lying-in Hospital," but with reference to the subject of affording Clinical instruction in the Diseases of Women, he observes, "I do not think it is possible to establish a regular Clinical Class at the Dispensary of the Lying-in Hospital at present." This is a point which must be left to the judgment and discretion of the teacher. At the fitting time, Dr. Harris will no doubt add Clinical instruction in the Diseases of Women to the other great educational advantages of his admirable Institution.

Dr. Wyndowe referring to the subject of text-books, remarks:—"There is always difficulty (a pecuniary one) amongst the students in obtaining the sanctioned text-books. As the Committee in its report recommended a more rudimentary course of instruction for the Chemistry Class, I would suggest, in accordance with their proposal, that for the Second Department students, the small Manual of Chemistry in Chambers' Educational course, price in Madras rupees two and annas twelve, be substituted for the present College text-book by Fownes, price rupees nine and annas four." Dr. Wyndowe's recommendation might well be extended in principle to all the classes in College. The standard text-book might be restricted advantageously to students of the Senior Department, whilst a cheaper epitome of the subject should, if possible, be selected for students of the Second Department. The present College text-books are expensive, and few lads of the Second Department can afford to buy the most recent editions of them. The whole question of text-books is, at present, in an unsatisfactory state. In the annual report of the class of Practical Chemistry, Professor Wyndowe remarks:—"Considerable inconvenience also was felt from the want of a supply of chemicals, apparatus, &c., my indent for which, though forwarded in August 1864, not having yet been complied with." It is needless to say that delays of this kind cause considerable embarrassment to departments concerned.

Mr. Bidie, in his annual report of the class of Materia Medica, makes a suggestion with reference to the "Manual of Materia Medica" by Dr. Montgomery, which well deserves consideration and adoption. This excellent little "Manual" is practically rendered useless as a text-book by the publication of the new British Pharmacopœia. Mr. Bidie proposes to prepare a "Manual" on the plan of that compiled by Dr. Montgomery, which shall contain the various changes sanctioned by the new Pharmacopœia. It might be well perhaps to postpone the publication of the proposed Manual until the appearance of the second edition of the British Pharmacopœia and of the new Pharmacopœia for India under preparation by Dr. Waring.

Syllabuses.

*1. Surgery.
2. Medicine.
3. Physiology.
4. Chemistry.
5. Ophthalmology.
6. Midwifery.
7. Materia Medica.

6. Syllabuses of the course of lectures have been prepared by the several Professors, and those marginally noted have been passed through the Press. These syllabuses are of great value to the students; some of them, indeed, should rather be called *epitomes* of the sciences of which they treat.

Constitution of the Departments and Classes at the commencement and close of the academic year, &c.

7. *Senior Department.* At the commencement of Session 1865-66, the Senior Department consisted of—

2	Government students in their	5th	year of study,
2	do do	do	4th	do
2	(1 Govt. and 1 Lane scholar)		3rd	do
2	Private students	do	1st	do

making a total of eight students.

Government students Chinapoo and Seethambaram Pillai, having passed their final examination successfully, will receive on this occasion the diploma of Graduate in Medicine and Surgery of the College.

Gnanamootoo Pillai, a student in his fourth year, who, consequent on the recommendation made in last report, had his stipend suspended by the Director of Public Instruction, was finally struck off the roll of the Senior Department on the 29th November 1865, on the ground of prolonged and unexplained absence from his Hospital and College duties.

One private student, Mathew John, supported by the Travancore Government, joined the College at the commencement of the Session. He has however been permitted, at

his own request, to withdraw, in order that he may prepare himself for passing the First Examination in Arts of the University, before commencing his medical studies.

There remain four students on the roll of the Senior Department.

The Final Examination Committee report as follows on Government students Chinapoo and Seethambaram Pillai :—

"Seethambaram Pillai came short of rejection by only *four* marks and Chinapoo by *thirteen.*" The same students are spoken of as being inferior to those of the same department in former years, and as having attained to but "a poor mediocrity" in their professional education. These remarks of the Final Examination Committee are justified if we regard solely the results of the late examination. On that occasion, however, the young men were singularly nervous and confused, and seemed unable to command themselves sufficiently to give moderately ready answers on points with which they are quite familiar. Presence of mind is one thing, the possession of information another. Happy is the student who has both; critical is his position, if having the latter, he yet lacks the former. During his curriculum, Chinapoo has had the first place in fourteen out of nineteen classes, and in the remaining five, he occupied the second place. In five of his classes, Seethambaram gained the highest position, and in fourteen the second.

These young men leave the College with the best wishes of their teachers for their success in life. If irreproachable conduct, high principles, zeal and diligence avail aught to secure success in life, then,—with God's blessing, their success may be regarded sure. The prospect of Government employment has been held out to them from the beginning of their career, and it is much to be desiderated that the sphere selected for them should be one of active professional exertion.

Pursooramen Naick, a student in his 4th year, whose stipend of Rs. 20 per mensem was suspended for one year in consequence of the unsatisfactory progress made by him in his studies, has so far secured the approbation of his teachers during the past Session as to warrant the recommendation now made of the restoration of his stipendiary scholarship.

Mr. Chipperfield remarks, "I consider that he has decidedly improved." "He is a young man of good conduct and of considerable industry; he is very anxious to improve, and is most attentive to his duties and classes, but he is somewhat deficient in intelligence, ability and acquaintance with English."

Government Student Gregory, and Lane Scholar Dhanakoti Rajoo have, as on former occasions, secured the approbation of their teachers by their conduct, attention, ability and zeal. In July last Mr. Gregory passed successfully the Preliminary Scientific Examination of the University, and he purposes appearing in a few days for his "First Examination" for the University Degree of M.B. and C.M.

Mr. Dhanakoti Rajoo will also appear in a few days for his "Preliminary Scientific" and "First Examinations."

Mr. Tyrrell, a private student, having finished his first year of study, will also appear before the Preliminary Scientific Examination Committee of the University.

The conduct of all these candidates for medical honors has been unexceptionable.

(B.) *Second Department.*

At the commencement of the academic year, the Second Department consisted of,—

8	First Class Students in their 3rd year,				
12	Second	do	do	2nd	„
20	Third	do	do	1st	„

making a total of 40 students. Eight students, constituting the Senior Class, having been found qualified as Assistant Apothecaries, leave College; one lad resigned the service, and 31 names remain on the roll of this Department.

The Final Examination Committee speak of the inferiority of the candidates to those of former years. As a whole, the batch is but a mediocre one, though Currie and Douglas are certainly rather more than average lads. It must be remembered that these lads have been educated upon that faulty system which has been corrected under Order of Government No. 84, dated 29th March 1865. The new rules necessitate a two years' preliminary hospital training before lads can join the Second Department of the College. The entrants of Session 1867-68 will be the first who shall reap the full

advantage of the new regulations. The conduct of all the young men of the First Class of the Second Department has been very satisfactory.

Second Class, Second Department.

The Second Class of the Second Department, taken as a whole, has done fairly. The results of the class examinations conducted by Committees of Professors, show that at the oral examinations in Physiology, Materia Medica and Practical Pharmacy, they have gained a high proportion of favorable marks; that at the oral examination in Anatomy, they have done well, and that in Surgery and Medicine, they have acquitted themselves fairly. In Minor Surgery, they failed. With the exception of the examination in Materia Medica, the written examinations on the several subjects of study have been less creditable to the class than the oral. In Medicine, they obtained but 42 per cent. of favorable marks. Dale is the most intelligent, and Ramachendra Numby the most deficient lad of the class. The conduct of these lads has been good.

Third Class, Second Department.

The 3rd Class of the Second Department, consisting of 19 students, taken as a whole, has done but indifferently this Session. Thirteeen lads passed a creditable examination before the Committees of Professors, but the rest have failed more or less signally.* At the oral examinations in Chemistry, Materia Medica and Anatomy, they acquitted themselves creditably; also at the practical examinations in Chemistry and Pharmacy. The written examinations in Chemistry, Materia Medica, and especially in Anatomy were less satisfactory.

* 1 Brown.
2 Whittaker.
3 Downing.
4 Currie.
5 Hayes.
6 Newnan.

The written examinations of the 2nd and 3rd Classes of the Second Department this year show indubitable marks of haste and carelessness, as if the students were under the impression that the *written* was of less value than the *oral* examination, whereas the fact is exactly the reverse, for the results of *written* constitute a better test of the progress and knowledge of the student than those of the *oral* examinations.

The conduct of the lads in this class has been good.

The following lads of the 2nd Class of the Second Department are recommended for discharge on the ground of incompetence.

N. B. Ramachendra Numby.
G. D'Santos.

and of the 3rd Class of the Second Department—

G. Whittaker.
J. Hayes.
S. A. Newnan.

The following lads of the 3rd Class of the Second Department are recommended to be remanded :—

S. Downing.
R. Currie.

(C.) *Junior Department.*

At the commencement of the Session the Junior Department consisted of—

23 First Class	Students	in their	2nd year	
32 Second	do	do	1st	„

making a total of 55 students.

Twenty-two lads,* constituting the Senior Class, having been found qualified to act as Hospital Assistants, leave College.

* One lad was sick in Hospital.

Thirty-three students remain on the roll of this Department. Of the students who appeared before them, the Final Examination Committee report as follows :—Only 22 students of the Junior Department presented themselves for examination, and all these passed. It must however be particularly borne in mind that though table No. 3 shows such marks as "*good*" and "*very good*" opposite several names, the examination *was of a most elementary character*, the Board remembered that the duties of Hospital Assistants had been defined by Government as *simply mechanical*, and it is *for such duties only* that these young men are fitted." The Examination Committee here refer to the terms of Government Order, No. 84, dated 29th March 1865, para 7.

Second Class of the Junior Department.

The 2nd Class of the Junior Department acquitted themselves fairly at the annual class examinations. In Anatomy, the percentage of favorable marks was 88 ;

in Minor Surgery 77; in Practical Pharmacy 70, and in Materia Medica 61. One lad, R. Moorgasen, No. 816, was absent from all these examinations. The conduct of the young men of the Junior Department has been good. A few of them have been punished for irregular attendance at the Hospital and Dispensary. The students of the Junior Department are instructed by the College Assistants, the Professors holding occasional examinations of the several classes.

The Senior Class met for instruction in Surgery under Mr. Wood 135 times, including 71 examinations. The Senior and Junior Classes met under Mr. Wood for instruction in Minor Surgery 31 times. Mr. Hamilton directed the studies of the Senior Class in Medicine, and of the Junior in Anatomy; the former class met 135 times, including 62 examinations, and the latter 133, inclusive of 48 examinations.

Mr. Ailsworth took charge of the classes of Materia Medica and Practical Pharmacy, the former of which met 134 times, including 35 examinations, and the latter 34 times.

At an early period of the Session it was found necessary to relieve Mr. Wilkins of all duties in connection with the Junior Department, the labour imposed upon him by the new arrangements being sufficient to engage all his attention. The tuition of the Junior Class in Anatomy was entrusted to Mr. Hamilton. The following lads of the Junior Department are recommended for discharge on the ground of incompetence:—

L. Solomon, No. 820.	Shabudeen, No. 815.
P. Rajagopaul, No. 823.	R. Moorgasen, No. 816.

Private Students.

Three private students attended certain classes of the College during the past year, and the sum of Rupees 120 in fees has been placed at the credit of Government.

General.

Prizes and Medals.

8. The Johnstone Medal has not been awarded this year. The Government Gold Medal has been assigned to C. M. Rungasawmy, No. 783, a student of the Senior Class of the Junior Department.

A small sum of money (Rupees 46-4-6) which formed part of a sum placed at the disposal of the Medical College

for the purchase of prizes by the late C. V. Conniah Chetty, Esq., was, with the sanction of the Director of Public Instruction, expended in the purchase of a small case of instruments, and under the designation of "the Conniah Chetty Prize" will this day be presented to C. Chinapoo, Government student, Senior Department. At page 21 of the last annual report, regret was expressed that the consignment of prize books had not arrived in time for the Anniversary of the College. The books reached the College on the 16th of March 1866, and the prizes were duly forwarded to the successful candidates.

The Library.

9. Five hundred and forty-five volumes have been added to the Library since the date of last report. A list of additions and donations is given in the appendix. The Student's Library contains 384 volumes.

The Museum.

10. Thirty-three additions have been made to the Museum during the past year. The thanks of the College are tendered to Mr. Honey for the various specimens of drugs presented by him to the Museum of Materia Medica, and to Mr. Sausman, Assistant Apothecary, for contributions to the Museum of Botany

Text-Books.

11. At the date of last report a reference regarding the supply of text-books to the students was under the consideration of Government. Under order dated 8th September 1865, No. 246, Government declined to assist the students in the purchase of their text-books.

Assistants, Prosectors, &c.

12. A list of the Assistants of the College and of the Students, Prosectors, &c., is given in the margin. A reference to the annual reports of the several Professors will show how assiduously and satisfactorily the Assistants to the Professors have performed their onerous duties during last year. Since last report Government have sanctioned the retention by the College of Mr. Wilkins' services on his promotion to the grade of Second Apothecary. Mr. Ailsworth, the Native Assistant, a painstaking and intelligent teacher, appeared before the Final Examination Com-

Assistants.
Messrs Wood, Wilkins, Harvey, Hamilton, Ailsworth.

Prosectors.
Gregory, Ellis, Douglas, Rath, Dale, and Rungasawmy.

mittee as a candidate for admission to the grade of Assistant Apothecary, and passed a most successful examination. The Committee allude to his qualifications in very flattering terms. It would be much to the advantage of the College were Mr. Ailsworth's services continued in connection with it.

The Prosectors have performed satisfactorily such duties as scant leisure enabled them to undertake. The Clerk, Librarian, Draughtsman, and other servants of the Institution have given satisfaction.

Sickness.

13. In last report notice was taken of the fact that much disease of an Asthenic character had occurred among the students during the Session. Dr. Paul has submitted a memorandum, showing that the ailments of the students during 1865-66 have been of a comparatively trifling character. No deaths have occurred among the College Students during the past Session.

HISTORICAL.

Historical notice.

14. A short historical notice of the principal events which have occurred since the last Anniversary of the Institution may fittingly conclude the present report.

(A.) In the historical retrospect of Session 1864-65, the principal features of Government Order No. 84, dated 29th March 1865, were indicated. Before the close of the Session a Notification* was issued by the Principal Inspector General embodying the rules sanctioned by Government in so far as they referred to the admission of lads to the Second Department. Subsequently, under date 20th November 1865,* Government sanctioned the rules proposed by the Head of the Medical Department for the preliminary training in hospitals and dispensaries of Paid Medical Candidates and Paid Medical Pupils. The several changes sanctioned by Government were brought into operation so far as this Institution is concerned during the past Session, 1865-66. The course of lectures on Hygiene commenced on the 30th of November, and that on Comparative Anatomy was delivered during the Summer Session.

* Dated 22nd April 1865.

* Order No. 331.

The new curricula of study were at once brought into operation, care being taken that the change from the old to

the new arrangements should be made without injuring the completeness of the courses of study of the several Departments. In consequence of the Division of the academic year into a Winter Session of six months' and a Summer Session of three months' duration, considerable alterations had to be made in the arrangements of days, hours, lectures, and examinations.

(B.) In a despatch from the Right* Honorable the Secretary of State for India,† dated 30th December 1865, No. 6, the Secretary of State indicates his view on questions connected with the operations of the Medical College of Madras. In this despatch, Sir C. Wood expresses his approval of the principle :—

* Vide Appendix.

† In reply to a communication from the Madras Government dated 13th February 1866, No. 43.

1. "That the course of education given in each Department should be fitted to qualify the young men under training for the duties of the particular class of appointments which they are destined to fill, and that it is not expedient to aim at qualifying them for higher duties, which some of them may, under exceptional circumstances, be called on to discharge." Further,

2. That in order to make it safe and proper to act on this principle, "it is necessary that provision should be made for the performance of such higher medical duties, by maintaining each class of the medical service in a state of numerical efficiency." Further,

3. The Secretary of State, referring to his Despatch of 28th July 1859 (No. 4), in which he called "attention to the propriety of extending the class of Sub-Assistant Surgeons, on account of the stimulus which the measure would afford to the entrance of an increased number of young men into the College, prepared to prosecute Medical studies in their higher branches," re-asserts the principle, and regards such a measure (namely, the extension of the class of Sub-Assistant Surgeons), as equally necessary for filling up those numerous appointments in the public service, which are beyond the acquirements to be expected in the class of Apothecaries on the one hand, and for which the establishment of the Commissioned Medical ranks is quite inadequate on the other.

4. The Right Honorable the Secretary of State further recognizes "that there is at present no such prospect of private medical practice among the native society of the Madras Presidency as would induce many young men of education to aim at high medical qualifications without the prospect of Government employment." But he points out how desirable it is that this object, one of the motives which led to the establishment of the Medical College, should be kept in view. Finally; he directs that the College curriculum and the requirements of the University should be brought into strict harmony.

This Despatch is the Magna Charta of this Institution.

(C.) On the 5th of April last, under instructions from the Director of Public Instruction, the Principal of the College issued a Notification containing certain alterations in the rules affecting the Government Scholarships. The scholarships, which were five in number,* and of the value of Rupees twenty per mensem each, are to remain the same as regards number, but are to undergo certain changes in the amounts of the stipends. To candidates who have passed the Matriculation Examination of the University (obtaining one-third marks in English), a scholarship on the old rules will be given, but to those who have passed the First Examination in Arts special advantages will be held out. They are to receive a stipend of Rupees twenty per mensem, to be increased to Rupees thirty on passing successfully and at the regulated time, the "Preliminary Scientific Examination," and a further increase to Rupees forty per mensem, on passing the "First Examination" for M. B. and C. M. of the University. These rules constitute a decided improvement upon the old. A paternal Government has done much ; it is for an enlightened and sensible native public to meet Government at least half way. Government service is a limited field. Spheres of private practice in the native community, though very limited now, will doubtless become more and more extended, as education and civilization progress.

* Vide Notification, dated 20th May 1861.

(D.) Under date the 8th September 1865 there issued from the India Office "Amended regulations for the examination of candidates for the appointment of Assistant Surgeon in Her Majesty's Indian Medical Service." All natural born subjects of Her Majesty of a certain

age and of sound bodily health, may be candidates. The certificates of this College are received by many of the Medical Colleges and Schools at home, hence the way is open, by which the students of this Institution and Medical Graduates of this University may obtain appointments in Her Majesty's Indian Medical Service. Of the graduates of this Institution two hold Her Majesty's commission, and of those who have been mainly or entirely educated at this College, four at least hold commissions in this Presidency. It is much to be desiderated that those interested in the advancement of medical science either for its own sake, or because it is an important branch of general education; or because they are desirous of helping on schemes of general philanthropy and usefulness, would consider how practically their good wishes and views could be carried out by founding scholarships in connection with this Institution, and by giving encouragement to deserving students in the shape of medals, gifts of books, &c. Already the Lane Scholarships have been productive of good; may we be permitted to point to them, and to say to those desirous of commemorating in India the name and worth of some distinguished Indian public servant, "Go and do likewise."

(E.) Under date the 18th August, No. 297 of 1865, the Government of India ruled that, pending a reference to the Home Government, the enlistment into the Medical subordinate service of persons who though born in India are the sons both on the side of the father and that of the mother of natural born British subjects, is prohibited. A subsequent reference on the point elicited from the Indian Government a communication cancelling this prohibition, provided such persons were not attested as soldiers. Some alteration in the Mutiny Act is contemplated to bring these persons within its provisions.

(F.) Under order No. 350, dated 18th November 1864, Government approved of certain alterations and additions to the Medical College buildings being made, at an estimated outlay of Rupees 43,200. The work was commenced in May 1865, and is still going on. It is to be hoped that every effort will be made to push it forward, and so put an end to the great inconvenience which at present exists. It is very desirable too that the esplanade lying to the North, East and South of the College building should be neatly

railed in and planted, and made over to the College. A fitting and ornamental appendage to the building would thus be secured.

(G.) By order of Government, No. 87, dated 27th March 1866, the Principal Inspector General of the Medical Department was appointed "Ex-officio Visitor" of the College.

The Principal in concluding this report, cordially thanks his brother Professors for the uniform assistance and support they have afforded him during the past Session.

A Quinologist sanctioned for Ootacamund.

Proceedings of the Madras Government.

Read the following Despatch from the Right Honorable the Secretary State for India, (Public), to His Excellency the Right Honorable the Governor in Council, Fort Saint George, dated India Office, London, 17th October 1866, No. 34:—

1. With reference to the recommendation contained in your Despatch to my predecessor, dated March 13th, 1866, that a Quinologist should be stationed at Ootacamund for three years to investigate various questions connected with Cinchona cultivation, I have now to inform you that I have, at the recommendation of Dr. Frankland, appointed Mr. John Broughton to this post. Mr. Broughton has worked as Dr. Frankland's Assistant, at the Royal Institution in Albemarle Street, and I am assured by that eminent Chemist that he has been occupied with organic chemistry for several years, that he has made original investigations of his own, and that he is already intimately acquainted with the chemistry of the Cinchona plant.

2. I herewith transmit, for the information of your Government, a copy of a letter which I have caused to be addressed to Mr. Broughton, informing him of the nature of the duties that will be expected from him, and directing him to report himself to the Secretary to your Government, in the Revenue Department, on his arrival at Madras. His appointment is for three years, and I have fixed his salary at £1000 per annum. I have also allowed him 150*l.* for outfit and passage, and a sum not exceeding 200*l.* for the provision of the necessary apparatus and chemicals, which will be shipped for transmission round the Cape.

3. It will be for your Government to decide, in consultation with Mr. McIvor and Mr. Broughton, whether the latter gentleman shall reside at Ootacamund or at the Neddiwuttum plantation; but it will be necessary to furnish, at one or other of those places, a room for a laboratory with a smaller room opening on it, and a supply of water.

4. Mr. Broughton will leave England by the Steamer of the 20th of November.

5. I have also had under my consideration, in Council, your Despatch, in the Revenue Department, dated May 25th, No. 24, 1866, reporting your proceedings in connection with the appointment of a Commission for testing the value of Cinchona alkaloids, other than quinine, as febrifuges; and requesting that further supplies of the sulphates of these alkaloids may be transmitted to Madras.

6. The arrangements of Dr. Shaw, the Officiating Inspector General of Madras, appear to be very judicious, with a view to testing the efficacy of Cinchonidine, Quinidine, and Cinchonine as cures for fevers; as well as for trying the bark, twigs, and leaves of the Cinchona, as simple decoctions. I am not, however, of opinion that it will be advisable, in the present state of our knowledge, to include Quinium amongst the febrifuge alkaloids to be experimented upon by the Commission.

7. One hundred and fifty ounces of the sulphates of each of the Cinchona alkaloids have been ordered from Mr. Howard, and will be shipped for Madras as soon as they are delivered to the Stores Department of this office.

8. I also herewith transmit thirty copies of a pamphlet by Dr. Gustave Planchon on Peruvian Barks, which has been translated from the French. Copies should be supplied to Mr. McIvor, and others who are engaged in Cinchona cultivation as well as to Dr. Shaw and the members of the Commission appointed to report upon the Cinchona alkaloids.

From Herman Merivale, Esq., to John Broughton, Esq., Royal Institution, Albemarle Street, dated India Office, 22nd Sept. 1866.

1. I am directed by the Secretary of State for India to inform you, that it is his intention to employ an Analytical Chemist to conduct investigations in concert with the Superintendent of Cinchona Plantations on the Neilgherry Hills; and that, at the recommendation of Dr. Frankland, he has resolved to offer you the appointment,

2. You will be under the orders of the Madras Government from whom you will receive instructions, and to whom you will report the

results of your investigations from time to time. It will not be necessary, therefore, to do more, on this occasion, than indicate very generally the nature of the duties that will be expected from you, and of the results that it is desired to secure from your labours.

3. The objects of the Government in introducing the cultivation of Cinchona plants into India, were the provision of an abundant and cheap supply of the febrifuge derived from them for the use of hospitals and troops in India, and the spread of the Cinchona cultition throughout the hill districts, in order to bring the remedy within the reach of all classes of the native population. The oldest trees on the Neilgherries have now been planted out for nearly four years, and the analyses of their barks, which have been made by Mr. Howard, prove that there is a very marked increase of the yield of febrifuge alkaloids under cultivation. The time has now come, therefore, when it is necessary to investigate the causes which regulate the yield of alkaloids from cultivated Cinchona barks, and to ascertain the preparation of the febrifuge which will combine cheapness with efficacy in the greatest degree. To attain these very important objects, the Secretary of State considers that a scientific Chemist should be associated with the able and intelligent cultivator who now superintends the plantation.

4. The analysis of bark from plants growing in different situations by a competent scientific Chemist on the spot, will be a principal means of discovering the conditions as regards elevation, climate, soil, and exposure, best calculated to produce the largest possible yield of alkaloids, those conditions of course varying with the different species. There are several difficult questions connected with the formation of the alkaloids in bark, and particularly with the changes in the alkaloids themselves, caused probably by cultivation, which should be carefully and diligently investigated. It will also be an important duty of the Chemist attached to the Cinchona plantations, to ascertain the difference, as regards yield and efficacy, between green and dried barks, and to make accurate analysis of the leaves, and hereafter possibly of the flowers of the different species. The best method of drying the bark must be decided by scientific experiments; and, finally, it will be expected from the Chemist that he should, through his investigations, enable Her Majesty's Government to arrive at a decision with respect to the best and cheapest method of preparing the febrifuge for use among the laboring classes of the natives of India. He will also be required to consider the questions connected with the manufacture of the Cinchona febrifuge for the use of hospitals and troops in India.

5. Dr. Frankland has assured Lord Cranborne that you have been occupied with organic chemistry for several years, that you have made original investigations of your own, and that you are

already intimately acquainted with the chemistry of the Cinchona plant; and His Lordship therefore feels justified in the expectation that you will prove competent to perform the difficult and important duties to which I have briefly alluded, in a way which will give satisfaction to the Government, and that you will advance a branch of science which, in its bearings on Cinchona cultivation, has now become of great economic importance.

6. Your investigations should be carried on after consultation with the cultivator who is in charge of the plantations, and I am to impress upon you the great importance of acting, on every occasion, in concert with the Superintendent of Cinchona cultivation. It will be useful also if you were to put yourself in communication with the Medical authorities, with reference to the investigations which are now in operation with respect to the comparative value of the different alkaloids.

7. Your periodical Reports are to be made direct to the Madras Government.

8. You are required to undertake to serve the Government for three years, on a salary of £1,000 a year. You will be allowed a sum of £150 for outfit and passage, and a sum not exceeding £200 for the provision of the necessary apparatus and chemicals, which will be payable at this office. The latter sum of £200 will be exclusive of freight and transit costs.

9. It is desirable that, in the event of your accepting this appointment, you should proceed to the Neilgherry Hills with as little delay as possible, and that you should arrange for the shipment of the laboratory previous to your departure from England.

10. On your arrival at Madras, you will report yourself to the Secretary to the Madras Government, in the Revenue Department.

ORDER THEREON, 14th December 1866.

1. Communicated, together with the enclosures, to the Superintendent of the Government Cinchona Plantations, and to the Principal Inspector General of the Medical Department.

2. Communicated also to the Accountant General with reference to paragraph 2 of the Despatch, and paragraph 8 of the enclosure.

3. With reference to paragraph 3 of the Despatch, Mr. McIvor will state whether suitable accommodation already exists or can be easily and cheaply provided for Mr. Broughton at Neddiwuttum. The Government are inclined to think that the best plan will be to constitute Ootacamund Mr. Broughton's head-quarters, at all events at first.

4. As the Secretary of State does not consider it advisable (paragragh 6) that Quinium should be included amongst the febrifuge

alkaloids to be experimented upon, no action need be taken by the Principal Inspector General Medical Department, on paragraph 2 of G. O. 6th November 1866, No. 3020.

5. The pamphlet referred to in paragraph 8 when received will be distributed as directed by the Secretary of State. The only two copies as yet received will be sent to the Principal Inspector General Medical Department, and Mr. McIvor.

Concession to Deputy Inspectors General of Hospitals.

The following extract from a Despatch from the Secretary of State dated 27th September 1866, has been published by the Governor-General for general information:—

Para. 5.—I have to inform you that I have decided that a Deputy Inspector General of Hospitals of the Indian Medical Service, above the age of 55, who, from ill-health, may be unable to complete the five years' service required to entitle him to the annuity* in addition to the ordinary retiring pension, shall be entitled (in common with other Medical Officers who, having attained the age of 55 years, may not be able to obtain the certificate of competency), to retire on the next higher rate of pension to that to which his length of service entitles him, provided that he be not already entitled to retire on the higher rate, viz., £700 a year.

6. This concession only applies to those Medical Officers of the Indian Service who entered the service before the promulgation of the Royal Warrant of 13th January 1860.

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* £250, paras. 36, 37 of Despatch No. 340, 7th November 1864.

BOOKS RECEIVED.

1.—On the Advantages derivable to the Medical Profession and the Public from the establishment of Village Hospitals. By Albert Napper, F. R. C. S. &c. Third Edition, 1866, Pamphlet 8vo. pp. 20. Lewis, London.

2.—The Science and Practice of Medicine. By Wm. Aitken, M.D., Professor of Pathology in the Army Medical School, &c. &c. In two volumes. Fourth Edition, 1866. 8vo. pp. 963, 1010... .... Griffin & Co., London

3.—The Madras People's Almanac and General Directory for the year 1867. No. viii. 1867. 8vo. pp 450 and lv. .... Gantz Brothers, Madras.

4.—The Practice of Medicine. By T. H. Tanner, M.D., F.L.S., &c. Fifth Edition, 1865 8vo. pp. 938 .. Renshaw, London.

5.—Hooper's Physician's Vade Mecum. Seventh Edition. By Drs. Guy and Harley, 1864. Folscp. 8vo. pp. 791 .... Renshaw, London.

6.—A Practical Treatise on Urinary and Renal Diseases, including Urinary Deposits. By W. Roberts, M.D., &c. Small 8vo. 1866, pp. 516.... Walton and Moberly, London.

7.—The Influence of Food on Race. By W. W. Ireland. Reprinted from the "Dietetic Reformer." 8vo. pp. 4 .... " "

PERIODICALS RECEIVED.

The Indian Medical Gazette. November and December 1866.

The Edinburgh Medical Journal. June, November and December 1866.

The Medical Mirror. November, December, 1866 and January 1867.

The American Journal of the Medical Sciences. April and October 1866.

The Ceylon Quarterly Medico-Chirurgical Journal. June and Sept. 1866.